



**Managing Major Emergencies:  
Recommendations to develop effective contingency  
planning in the United Arab Emirates**

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## **DECLARATION**

I certify that this thesis is an original research conducted through several activities conducted during the course of this PhD research. This work has been conducted and submitted in accordance to the regulations of the University of Salford in order to obtain a PhD degree. Other published work derived from the research findings and literature review are listed in appendix “D”.

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## **DEDICATION**

This thesis is dedicated to my mother.

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## LIST OF ABBREVIATIONS

<b>Abbreviations</b>	<b>Meaning</b>
ADP	Abu Dhabi Police
CP	Contingency Planning
EM	Emergency Management
EMA	Emergency Management Australia
EP	Emergency Preparedness
FEMA	Federal Emergency Management Agency
IAEM	International Association of Emergency Managers
IEM	Integrated Emergency Management
IFRC	International Federation of Red Cross and Red Crescent Societies
IHC	International Humanitarian City
ME	Major Emergency
MENA	Middle East and North Africa
MPRR	Mitigation, Preparedness, Response and Recovery
NCEMA	National Council of Emergency Management Authority
NFPA	National Fire Protection Association
NRF	National Response Framework
PPRR	Prevention, Preparedness, Response and Recovery
SOP	Standard Operational Procedures
UAE	The United Arab Emirates
UK	The United Kingdom
USA/US	The United States of America
UNHCR	United Nations High Commissioner for Refugees

## GLOSSARY OF KEY TERMINOLOGY

<b>Key Terms</b>	<b>Description</b>
<b>Disaster</b>	Any sudden event which can which can seriously disturb a society and cause disruption and loss of human life, materials and environment in such a way that it is beyond the ability of the affected society to cope using its own resources (Coppola, 2011; Haddow et al., 2011).
<b>Disaster Management</b>	The organisation and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, with focus on preparedness, response and recovery so that the impacts of disasters can be lessen (IFRC – International Federation of Red Cross and Red Crescent Societies)
<b>Emergency</b>	An event, actual or imminent, can endanger or threaten life, disrupt and can adversely affect the safety of people, place, properties and the environment (Alexander, 2002: Canton, 2007).
<b>Emergency Management</b>	A process that involves plans, structures and arrangements which are established to bring together all stakeholders in a comprehensive and coordinated way for prevention, response and recovery (Alexander, 2002)
<b>Hazard</b>	A rare or extreme event in the natural or man-made environment that adversely affects human life, property or activity to the extent of causing disaster (Coppola, 2011). It is also a natural or man-made phenomenon which may cause physical damage, economic losses, or threaten human life and wellbeing that occurs in locations inhabited by people (Canton, 2007).
<b>Incident(s)</b>	An actual or impending hazard impact, either human caused or by natural phenomena, that requires action by emergency personnel to prevent or minimize loss of life or damage to property and/or natural resource (Alexander, 2005)
<b>Lessons Learned</b>	Knowledge and experience (both negative and positive) derived from observations or gained through operational experience such as actual emergencies or exercises that are used to improve performance of others (Birkland, 2006).

## **ABSTRACT**

Major Emergencies do pose a challenge for emergency organisations and services to manage when they occur. As observed in the United Arab Emirates (UAE), major emergencies occur at locations and times that increases the complexity of the event, thereby straining existing resources for response. Although major emergencies have been managed in the UAE using some of the best resources, the poor response due to coordination problems, and lack of planning arrangements that incorporate lessons learned makes the occurrence of major emergencies more severe than it should be. This means that in-depth knowledge, understanding and coordination of major emergencies is mandatory for emergency organisations responsible for dealing with major emergencies. Having in place a comprehensive planning process such as Contingency Planning that can sufficiently mitigate the unfolding characteristics of major emergencies is also important. Thus, this study aims to develop guidelines and recommendations for UAE governing authorities for managing major emergencies through contingency planning.

Study adopted interpretivism philosophical stance and inductive approach. The research aim is achieved by conducting a survey and case study strategies. A questionnaire survey was distributed to 90 officers and 17 senior officers and managers were interviewed. All participants were from three organisations; the police, civil defence and the National Emergency Crisis and Disaster Management Authority (NCEMA) in the UAE. The research participants were experts who are either responsible for planning for emergencies or who had been involved in dealing with major emergencies. The case studies of major emergencies from the United Kingdom, United States, New Zealand and Japan were examined in order to identify mechanisms for lessons learned. Two case studies of major emergencies in the UAE were also critically evaluated in order to examine the current practices and arrangements for dealing with major emergencies and evaluated against learning mechanisms used in other countries.

The research findings revealed that, there is lack of knowledge and understanding of major emergencies and contingency planning amongst practitioners which leads to a wide spread confusion amongst emergency organisations. Second, current practices and arrangements for dealing with major emergencies are insufficient and lack effective contingency planning processes. Third, best practice exists within each of the three organisations examined which can be adopted as mechanisms for lessons learned. Lastly, challenges peculiar to occurrence of major emergencies are not well-known in UAE emergency organisations, thus response to



major emergencies have not been effective. The implications on contingency planning in UAE is that without addressing these findings, major emergencies will continue to have significant impacts on life and livelihood in the country. Therefore, the research recommends a four-principle process for UAE governing authorities as guidelines for educating and training emergency organisations to better understand the characteristics of major emergencies and steps for effective contingency planning. By so doing, contingency planning will be more effectively implemented, monitored and sustained throughout the phases of emergency management in the UAE.

# **CHAPTER 1: Introduction**

## **1.1 Introduction**

The aim of this chapter is to provide a general introduction for this research, “managing major emergencies; recommendations for developing effective contingency planning.” This chapter is divided into eight main sections with the first starting with a brief background to the study area. Subsequent sections provide a context for the research area, justify the motivation for the research, and outline the research aim, questions, and objectives, as well as the research scope and methodology. This introduction chapter is important for understanding the justification for conducting this study and the focus of each chapter of this thesis in providing context for and achieving the study aim.

## **1.2 Background and Context of the Study**

The ability to manage disruptive events and their aftermath is a challenging task for governments (Perrow, 2011). This is because when preparation is inadequate or ineffective, disruptive events like emergencies and disasters are known to be disruptive and harmful to social welfare, economic welfare, business welfare, and human welfare, as well as to the environment. Different parts of the world have experienced emergencies and disasters that have been complex, extreme, or catastrophic to the extent that these events place a considerable demand on time, communication, and other forms of resources which are at times limited or unavailable (Renn, 2008).

Inadequate preparation for the onset of disruptive events can have significant impacts on the environment and on people (Haddow et al., 2006). While it is sometimes difficult to determine the scale of such emergencies and the level of impact they will have prior to their occurrence, it is still the responsibility of emergency organisations to prepare to manage them. In order to mitigate the impact of emergency, emergency or disaster management requires regular assessment of risks and plans so that the procedures for managing incidents are suitable and effective in managing emergencies when they occur (Alexander, 2002).

Renn (2008) further explained that, risk governance which is the way risk is handled should be one which follows a systematic approach of assessing the nature of risks, the evaluation of its impact, the perception of risks by societal actors and how risks are subsequently managed and

communicated. It is often challenging to subject risk management to this logical flow (Renn, 2008), perhaps because experience of managing past incidents have demonstrated that regular review of plans and risk governance are insufficient in managing the extreme disasters (ME) experienced in recent years (Meyers, 2011). Although there is a need to improve planning and the ability to respond more effectively to disasters (Renn, 2008), it is also important to identify and learn from past incidents.

It is necessary to include the lessons learned in a systematic way so that the risks of future incidents can be reduced, especially with regard to the risks which are not preventable. According to Meyers (2011), this can be made possible by documenting the lessons learned and then using them to improve preparedness for future emergencies that are major or complex. It infers that processes need to be feasible, realistic and appropriate for the nature of incidents experienced at the moment. Examples of these incidents include Japan tsunami which occurred in March 2011, hurricane Sandy which occurred in USA in 2014 to mention a few. Incidents which has challenged normal emergency management procedures have been happening around the world, especially in the Gulf region (Dhanhani et al., 2010). Examples incidents that challenged normal emergency management procedures in the UAE include, but not limited to 2014, 2015 and 2016 severe storm and flooding, and the annual fog-caused accidents.

As a result, societal risks have increased, causing both natural and man-made hazards which affect people, the environment, and the economy as well as disrupting livelihoods (Dhanhani et al., 2010). While there have been observable weaknesses in risk communication and in the way warning messages have been transferred from emergency organisations to the public (Al Ameri, 2010), the events themselves have happened with unpredictable timing or in overwhelming magnitude. These issues provide the context for this research investigating how major emergencies are managed with a view to improving the procedures for managing them. Renn (2008) explained that the way risk is handled and the systematic approach of assessing the nature of risks can ensure that societal risks are mitigated.

The intricate process required for managing major emergencies and the way emergencies are quick to escalate makes it necessary to learn how to effectively manage them, as well as better plan for, and respond to them. This need emphasises the importance and relevance of contingency planning which is a process that helps to build capacity for dealing with incidents with potential to escalate, or ones with extreme characteristics that may impact the environment, people and economy (Andrew and Carr, 2013). Even when the ways in which

risks present themselves during ME are well-understood, the time pressures, operational issues, logistical infrastructure issues, and issues of insufficient capacity to respond during disasters make it more challenging to manage disasters (Neef and Shaw, 2013). Hence the need for planning arrangements which will put all the issues revolving around managing extreme or complex events into consideration especially time required to deal with anticipated problems into consideration before the onset of the emergency. This need provides the background to this research on contingency planning and the need to manage major emergencies. The next section emphasises the significance of this research.

### **1.3 Research Justification**

A few incidents which have occurred in the United Arab Emirates (UAE) in the last decade have put the emergency response arrangements to test. While some of these incidents have recorded fatalities, a few were minimal in their impact on the public and services. The UAE have suffered the impact of events such as cyclones (cyclone Gonu and Cyclone Sidr in 2007, and cyclone Giri in 2010) and sandstorms (annually), flooding (2008; 2013; 2014), earthquake (2013), Tsunami and tropical storms (NCEMA, 2014). Other major emergencies have included plane crashes at Sharjah International airport (in February 2004, November 2004, and October 2009) and road accidents (in March 2008, and 2011) which have resulted in deaths, significantly disrupted services, and destroyed properties (Mahoney, 2013), showing the inability of emergency services in the UAE to promptly respond to disaster events.

In terms of impacts and numbers that demonstrated the severity of the events, cyclone Gonu resulted in 78 fatalities, 37 missing people and total damage of 4.4 million USD covering UAE, Oman, Iran and Pakistan (Fuad, 2009). Although these events were managed to the best of ability of the emergency organisations in the UAE when they occurred (NCEMA, 2014), the poor planning response, lack of coordination and contingency arrangements for major incidents suggest the need for better planning and response. Responses to these events were jointly led by the National Emergency Crisis and Disaster Management Authority (NCEMA) and Abu Dhabi Police (ADP).

However, the ADP had greater responsibility in ensuring the safety of all during response to all these incidents. For example, in January 2014, the police command room in Dubai received 2,198 calls between 5:00 a.m. and 2:00 p.m. due to rain-related incidents (KT Team, 2014).

Even though the police did not close the roads to avoid major incidents, there were traffic congestions in some areas during peak hours as a result of these incidents (KT Team, 2014).

The rain-related incident in January resulted in the death of one person on Shaikh Mohammed Bin Zayed Road where flood water had accumulated, there were other injured people who were rushed to the hospital and near misses where no one was injured. In November 2013, there were similar incidents resulting from flooding in Abu Dhabi, although there were no major incidents recorded this time due to early warning. From 5:00am to 12:00pm on Thursday 21<sup>st</sup> of November, Dubai police received about 3253 calls and recorded about 385 traffic accidents (Gulf News, 2013). The Global village (a tourist attraction in Dubai) remain closed due to unpredictable weather conditions; an advice which was provided by Dubai police, Civil Defence and National Centre of Weather Forecast (Gulf News, 2013). This decision was made to ensure that the situation can be effectively managed, to prevent escalation of the situation due to human factors, and to prevent further harm to people.

Hence, the goal of this research in contingency planning for major emergencies is to develop guidelines which can help the ADP respond more effectively their occurrence. The ability of the ADP to effectively manage any type of major event will help the government of the UAE to reduce the enormous financial burden, impacts, and loss of life that occurs during a major emergency. Since the UAE is a major hub for tourism, oil production, and international trade, there is need to improve planning for emergencies and guidelines which will help responders to manage complex or extreme events more effectively. There needs to be minimal or no interruption in tourism, oil, international trade and human activities as is currently experienced in the country during past emergencies. This fundamental problem emphasises the importance of this research.

After every emergency, efforts are made by the ADP to train and run simulation exercises together with other agencies to help improve understanding between agencies involved in responding (Neef & Shaw, 2013). While this has led to the creation of more departments in the ADP, the problems in responding to major emergencies have persisted in the UAE. A recent disaster report has identified that problems include time pressure, operational issues, logistical infrastructure issues, and insufficient capacity to respond during the onset of disruptive events (Neef & Shaw, 2013). It is possible that by improving planning arrangements to incorporate all foreseen and unforeseen problems before the onset of an emergency, the UAE can experience minimal operational challenges when responding to major emergencies. This

assumption emphasises the need for contingency planning that can guide and improve the efficiency of major emergency management.

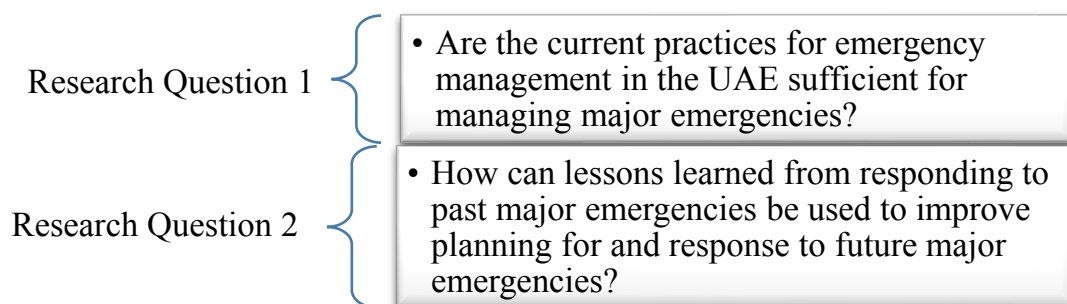
#### **1.4 Research Aim, Objectives and Questions**

The aim of this research is to develop guidelines and recommendations for UAE governing authorities to manage major emergencies effectively through contingency planning. In order to do this, this research aims to investigate and evaluate best practices from past emergency events in the UAE and in other developed countries. The guidelines developed as a result of this research are expected to help UAE government authorities to manage future major emergencies through effective contingency planning.

##### **Research Objectives**

1. Define major emergencies and contingency planning from literature and UAE context.
2. Examine current practices and arrangements used by the UAE government authorities for dealing with major emergencies.
3. Critically evaluate best practices and lessons learned from managing major emergencies in other countries and in the UAE.
4. Critically assess challenges for dealing with, drivers for improving and barriers that hinder the ability to improve response arrangements for managing major emergencies in the UAE
5. Develop guidelines as recommendations for contingency planning and managing major emergencies in the UAE

##### **Research Questions**



These research questions have been derived from the first four research objectives and will be determinants for assessing the outcome(s) of this research. The questions, especially research question 2 also proved vital in identifying best practice and for achieving “objective five” which is; “to develop guidelines as recommendations for contingency planning and managing major emergencies in the UAE”.

### **1.5 Definition of Key Concepts**

Certain key concepts influence the discussion and critique in this study. Key concepts like emergency planning, routine emergency and contingency planning are concepts that influence all aspects of the objectives outlined in the previous section. These concepts also inform the criticism of key terminologies defined in the glossary.

**Emergency Planning** - Emergency planning or preparedness refers to the process of informing, developing capacity of, and training the emergency agencies and stakeholders who may be affected by the impact of an incident using tools that may help to increase survival and minimise loss (Alexander, 2005). According to Andrew and Carr (2013), emergency planning, by nature, involves immediate or continuous reaction from all organisations involved in the planning process. This is why a better understanding of routine emergency is important so that responders are able to distinguish between major emergency and routine emergency.

Major emergency is an event with high levels of complexity and ambiguity (McMaster and Baber, 2012). From this explanation, ME may appear to be impossible to deal with, or as Boin and T’Hart (2003) put it, its effective management may appear impossible. However, the explanations in Chapter Two reveal that theoretical explanations of MEs indicate that ME has progress or stages in which they follow before it becomes complex to manage. Therefore, ME in this research is defined as any event with initial physical phenomena like fog, flooding, tsunami, earthquakes, etc. which is escalated by human factors such as road traffic collision, bad incident management, lack of contingency planning, that result in consequential physical impacts with severe outcomes on human, society and ecosystems (Ritchie 2004; Perrow 2011).

Routine Emergency may be defined as a sudden or imminent incident that requires immediate action from one or more emergency organisation, but usually an incident that does not require major coordination or may be dealt with by a single emergency organisation (Dillon et al,

2009). From this definition, it is noticed that routine emergency connotes events that can be managed by one emergency organisation, or one that is not resource demanding, and that can be managed effectively without complexity and external aid. This differ from explanations of ME that will be further examined in Chapter Two which is an emergency that may escalate, become complex and challenging to coordinate.

Contingency Planning may be defined as measures developed to prepare for and to react to possible event changes which exceed the containment capability of normal response efforts, yet the impact of which can severely affect security, resources, assets, human life, and the wider society (Schneider, 2004). Due to the key concepts and terminologies in this research, contingency planning as used in this research refers to measures and arrangements developed to prepare for, and to respond to event occurrence and change that exceed normal response efforts, whose impact can severally affect security, resources, assets, human and the society (Schneider, 2004; Andrew and Carr, 2013).

Defining these key concepts are important, and helps to clarify usage and explanations in the next chapter. It also clarifies the differences between the concepts and their relationship to the research terminologies in the glossary.

## **1.6 Scope and Limitations**

The scope of this research revolves around the research objectives. This research uses literatures, reports, and other valid, documented materials relating to major emergencies, contingency planning, and emergency management in general to develop recommendations for improving planning and response to major emergencies in the UAE. It also includes examining case studies from the US, the UK, Japan and New Zealand, countries that are advanced in emergency and disaster management and from which the UAE has adopted emergency management models. Case studies from the other four countries are used as reference to and as means of understanding major emergencies both in the UAE and in a wider context beyond the UAE.

Furthermore, this research focuses on major events which occur either as emergencies requiring the joint effort of all emergency agencies to respond and/or as events that can potentially lead to disasters requiring the support of international search and rescue teams from other countries. Also, major events as mentioned here can be either man-made hazards or natural hazards or a



combination of both. This is because the police take the lead in all crises, emergencies and disasters in the UAE, hence the role and focus of the National Emergency Crisis and Disaster Management Authority (NCEMA) which is the national authority that coordinates all arrangements for public safety in the UAE.

The scope of this research is therefore limited to investigating and evaluating existing literatures that relate to extreme or major incidents that have occurred in the UAE, the US, the UK, New Zealand and Japan. Primary data was collected through semi-structured interviews and questionnaires from participants in the UAE to investigate current practice and identify if there is contingency planning or contingency plans for managing major events. The data collection techniques were chosen with the aim of ensuring that unbiased and objective data is collected.

The researcher selected participants from organisations which are responsible for planning and response to crisis, emergency and disaster incidents in the UAE and overseas. The research respondents are experienced and expert personnel in Abu Dhabi Police (ADP), the Civil Defence and National Crisis Emergency and Disaster Management Authority (NCEMA). As this research is funded by the UAE government, it is important that the research scope focuses on the legislative arrangements and the remit of crisis, emergency, and disaster management practice in the UAE.

Therefore, all data collected retained focus on this scope and was analysed using the most suitable analysis tools for each type of data, while the results were triangulated to achieve reliable and valid data. Results from this research have been key to identifying best practice, which helped to develop guidelines and recommendations for managing future major emergencies more effectively through contingency planning in the UAE.

## **1.7 Research Methodology**

In adopting methods for undertaking this research, the researcher ensured that the research objectives played a major role in determining the appropriate methodology strategies. The “Research onion” by Saunders et al. (2009) was adopted as a guide during the methodology selection process choosing interpretivism philosophy, inductive approach, case study, documentation, and survey strategies, mixed-method choice, cross-sectional time horizon and data collection techniques and procedures as the most suitable for this research. This is to ensure that the techniques used led to collecting valid and reliable data. The theoretical analysis

of this research was carried out through epistemological underpinnings, approaches, strategies, data collection, and analysis processes.

Interpretive philosophy, which is based on inductive reasoning, to derive specific information about contingency planning and major emergencies that helped to justify the need for contingency planning. Within the philosophical stance adopted, the ontological view adopted for this research is both subjective and objective; it is based on personal constructed values, values laden in emergency and disaster management doctrines and principles, and on the researcher's experience in emergency and disaster management. The epistemology derives perception of experts and groups working as emergency and disaster professionals in the UAE who base their practices on standards in emergency and disaster management. Axiology of the data have been based on generally accepted principles, concepts, and norms in emergency management and with respect to the research aim and objectives.

Once the philosophical stance that applies to the research aim and objectives were decided, it further influenced the approach selected which is inductive approach. Inductive approach is consistent with interpretive philosophy due to its theory building and bottom-up approach (Saunders et al. 2012). Following on this, strategies were combined to arrive at a more valid and reliable outcome (Creswell, 2009). Strategies used include survey, interview and case study where organisations in the UAE were used to better understand current practices for dealing with MEs.

Based on this, the research choices (which is the fourth layer in the onion) adopted is mixed methods which is the combination of different, but complementary data sources for a research (Saunders et al, 2012). All research activities were conducted within a cross-sectional time horizon, where activities overlap within a specific timeframe (Saunders et al. 2009). Time horizons is the fifth layer in the research onion, and the last layer is techniques and procedures which included the data collection techniques, and data analysis procedures. A detailed research inquiry process and methodology is discussed and justified in Chapter Three which is the Methodology chapter.

## **1.8 Contribution to Knowledge**

This research aims to provide more understanding about extreme events and the patterns of their occurrence. To do this, the research explores academic and theoretical explanations for

extreme events, which inevitably contributes to knowledge in the field of crisis, emergency, and disaster management. Both secondary sources and primary sources of data also critically examine problems with managing events that occur in unprecedented scales. This also contributes to knowledge about disaster events in the 21<sup>st</sup> century and increases awareness about the importance of planning and preparedness activities. Planning as mentioned here refers to planning for events that may become complex, complicated and/or escalate after the onset, and the preparedness activities that may increase effectiveness of response to MEs.

This research also contributes to knowledge by improving understanding of concepts in emergency and disaster management, since this research provides deeper understanding of the incidents that prove more challenging to manage due to their nature, scope and their tendencies to escalate. In addition to this, better understanding of challenges peculiar to dealing with MEs were made possible through the identification and assessment of challenges against elements of effective contingency planning. Closely related to this, is also the contribution to knowledge attained by identifying barriers and measures that may be taken to mitigate the impacts of barriers through the application of drivers that may enhance response arrangement to MEs.

While these contribution to knowledge is undisputed, the guidelines and recommendations for improvement is a hallmark for this work, the UAE and for the academic field of emergency and disaster management. Above all, the research contributes to knowledge by showing the limitations of basic emergency planning arrangements for managing major emergencies and the need for a better understanding of extreme events that require contingency planning and/or contingency plans for more effective response. Therefore, this research advances knowledge and practice in crisis, emergency, and disaster management, but with a main focus on the link between the preparedness and response phases of emergency management.

## **1.9 Thesis Structure**

Requirements for conducting and documenting a PhD research indicate that due process needs to be followed. Certain patterns, process and structure are required, as such, this thesis is structured in a way that the research context and outcomes are understood by the reader.

Chapter One is the introduces the study area and research scope. As previously mentioned, five objectives have been derived from the research aim, which forms themes for chapters in this

thesis. From this chapter, it is evident that certain criteria need to be met in order to achieve the research aim, and these include conducting a literature review, and collecting primary data.

Chapter Two is the literature review that examines existing research, explanations and description of research themes. This chapter defines key words and research terminologies, explains concepts that relates to them and has sections that examines each objective from existing sources of information. The chapter reviews current practices and arrangements in the UAE for dealing with emergencies and any disruptive events, and it evaluates best practices and lessons learned in other countries. Case studies of major emergencies in the UK, US, Japan, New Zealand and UAE were identified and evaluated using the elements identified from previous sections. This chapter is important for identifying if any best practice and lessons learned exist in current practices and arrangements in the UAE. Identifying gaps in the system is also important for further investigation conducted during this research. Therefore, the critical background from documented information provides foundation for forging ahead in this research. The chapter highlights the discoveries in the literature and case study evaluation so that areas that needs further inquiry are identified, and empirical context for which this research needs to be assessed are defined.

Chapter Three is the methodology which provides an overview of approaches, methods and techniques adopted for conducting this research. It explains and justifies the methods selected for use in this research and their significance for collecting valid and reliable data that leads to objective outcome.

Chapter Four provides the findings from the primary data collected in the UAE. It analyses the data and interprets their meaning in relation to the research objectives and gaps being investigated, and for which further explanations are sought. This chapter focuses on analysing the situation in the UAE, so that new discoveries are identified.

Chapter Five discusses the entire research results. It starts by summarising the findings from the primary data, it then discusses the primary data findings in relation to secondary data findings in the literature review, i.e. chapters two and four. This deduction made from this chapter contributed to the development of guidelines for improving the arrangements for dealing with major emergencies in the UAE. This chapter assigns guidelines based on the functions of each emergency agency in the UAE in relation to their duties in response to major emergencies.

Chapter Six concludes this research by outlining the major conclusions, contributions to knowledge and practice, as well as the recommendations required for practice and further research. The chapter also marries the outcomes with the research aim, in order to determine how the aim had been achieved.

### **1.10 Summary of Chapter**

This chapter provided a background to the research as well as overview of the location of study. It has justified the reasons for undertaking this study and outlined the aim, objectives, and research questions, all of which have provided information about the specific focus of this research and information about other chapters in this thesis. Other sections explained the scope and limitations of this research and how they are managed, this section also briefly discussed the research methodology.

Although this chapter has raised the question of whether it is possible to effectively utilise the lessons of past disasters for preparing for future disasters, a review of existing literatures is important to provide explanations for the research area. Therefore, the next chapter is devoted to providing a critical review of literatures existing in textbooks, articles, reports and other archival materials written on this subject and area related to the research scope.

## **CHAPTER 2: Literature Review**

### **2.1 Introduction**

This chapter aims to review concepts of major emergency, contingency planning and arrangements for emergency management in the United Arab Emirates (UAE). Existing research and documented information on emergency and disaster management, learning from past major emergencies and contingency planning are critically examined in order to determine the epistemology in this field of study. The chapter has seven main sections where the first examines concept of Major Emergencies (ME), types of and management of emergency. Section 2.3 examines concept of contingency planning, and sections after this critically review current practices and arrangements in the UAE, global best practice, challenges and potential drivers for improving planning and response to ME. A summary of findings and the entire chapter are presented in the latter part of this chapter. This part also discusses the importance of this chapter and its relevance to subsequent chapters, especially how it informs the process for answering the research questions and achieving the research aim.

### **2.2 Concepts of Major Emergencies**

Chapter One has made reference to events which can be disruptive in nature. The justification for this research also finds roots in events that may be classified as emergencies, disasters, or incidents. Academic text and practice terminologies in this field often use these terms to refer to different types and scales of disruptive events. To avoid confusion in this research, these key terms are examined and reviewed from the academic context. To avoid confusion in this research, the key words are examined and reviewed from academic context.

Clarification of terms and review of concept of ME is important since there are significant body of work in the field of disaster research. For example, the word disaster has been defined by different authors as events with severe impacts (Perrow, 2011), requiring multi-agency strategic response (Smith and Dowell, 2000) or ones with almost impossible

task (Boin and T'Hart, 2003). Putting all these characteristics into consideration, disaster as used in this research refers to the definition provided in the glossary of key terminologies. The perspectives of more recent authors on what constitute disaster is based on the unprecedented nature in which disasters have been occurring in the last decade. Definitions by Coppola (2011) and Haddow et al. (2011) suggest that disaster management require external intervention, support and resources for any affected society to deal with its impact or and even recover from its impact.

According to Alexander (2002), it is not only disasters which have the ability to cause disruption in a given place, emergency may also cause major disruption (see glossary for definition of emergency). Emergency requires coordinated response by organisations trained to do respond in a coordinated manner required for managing disruptive event (Dillon, 2014). Therefore, main difference between disaster and emergency based on definitions and explanations above is that while disaster will require response and international intervention, emergency require coordinated response from within the country or society where it has occurred (Dillon, 2014).

However, the similarity between the two is that they can be both disruptive to the extent that great level of resources will be required to manage them in order to prevent loss of lives, properties and to mitigate their impacts. Therefore, both emergency and disaster are mentioned in this research as reference to the explanations and understanding provided in the glossary and in this section. While disaster is yet to occur in the United Arab Emirates (UAE) that require international support to respond to, emergencies have occurred that require the joint efforts of all emergency agencies in the country or from two Emirates.

Therefore, emergency is the preferred term used in this research, but may be interchangeably used in the practice sense by practitioners in UAE who are unaware of the difference from academic context. Regardless of the term used, the emphasis in this study is that the significant researches conducted on disasters or emergencies have identified the number of problems associated with coordination of large-scale emergencies. Such problems and the associated impacts have motivated this study which seeks to investigate current arrangement, in view of proffering solutions. Despite the varied perspective on emergency or disaster, it is undisputed that disruptive events have severe impacts. But Wisner et al. (2004) argued that the severe impacts of any emergency is influenced by the level of exposure of a place and or the vulnerability of people or

system. Therefore, Smith and Dowell (2000) argued that it is the ability to recognise that large-scale emergencies occur with little or no notice is very important.

Crichton et al. (2000) affirms that, it is the multi-agency operations to any large-scale incident are shared responsibilities which are often problematic, thus affecting effective management of ME. According to McMaster et al. (2007), the initial stages of any incident is always characterised by insufficient information, and as such, event like ME may escalate due to this factor, and not necessarily because of the vulnerability of people alone. It is therefore critical for emergency services to understand that response to MEs may entail temporary arrangements and organisations of agencies to work together and improvise their organisational structure in order to effectively deal with occurrence of ME (Smith and Dowell, 2000).

As explained by Crichton et al. (2000), ME require cooperation and share response duties between different emergency agencies which may be problematic. From this perspective, the management of ME will require the application of knowledge beyond the typical emergency response domains and the coordination of interdependent tasks, with high level understanding of the uncertainty (Boin, 2004; Becerra-Fernandez et al., 2008; von Lubitz et al., 2008). This indicate that occurrence of ME may influence, increase exposure, increase the impact and even escalate when they occur due to inability and low knowledge of their characteristics (Perrow, 2011). For instance, events such as cold weather, drought, earthquakes, flooding, heat waves landslides, fog, storm etc. are events which are popularly known to have unpredictable impacts or escalate in impact, even though they are predictable events themselves. These events may also become ME whenever they have ripple effects causing further incidents in the community (Boin, 2004).

A typical example of this is a foggy weather causing bad visibility for drivers, which in turn leads to multiple car accidents on a major highway. This means that, the ability to manage emergencies of this nature and their aftermath can be challenging for constituted authorities and emergency organisations (Perrow, 2007). In terms of impact, ME are known to disrupt and harm social, economic, business, human welfare and the environment and when there is no adequate preparation for them (Smith and Dowell, 2000). McMaster and Baber (2012) explained that ME have inherent characteristics which put massive demands on time, communication and other forms of resources which are at times limited or unavailable.



This shows that inadequate preparation for ME can have significant influence on the environment and people (Byman, 2005), indicating that inadequate preparedness or planning is also a potential factor for escalating ME. Even though the scale of emergencies or disasters and their impact is sometimes difficult to quantify, making it challenging to deal with them (Perrow, 2011), they still need to be effectively managed to protect lives and properties. Therefore, the MEs as mentioned in this research refers to any event which has never been experienced by organisations or community or an event which occurs in a manner which exceeds the expectation and ordinary routine capabilities of community and emergency agencies (Perrow, 2011; Leonard and Howitt 2007). It can also be a situation with 2 or more serious threats occurring at the same time (Boin, 2004; Leonard and Howitt 2007).

Regardless of the characteristics of an ME, it is still the legislative duty of the government to respond to it so that lives and properties are protected and destruction can be prevented. Thus, the definitions and descriptions of MEs emphasise the need to better understand the processes, contexts, and factors that may escalate MEs and the need to identify more effective ways of managing them and mitigating their impacts. The existing body of work in this field has also identified and discussed types of emergencies, and established that the nature of emergencies or disasters often determines the management of and response to them. To this end, the next section reviews and critically examines emergency types and their management.

### **2.2.1 Emergency Types and Management**

Emergencies or disasters are motivated by what is called hazard, which ISDR (2009) and explained that the impact of hazard is influenced by the level of vulnerability to hazards and exposure to hazard. Vulnerability refers to set of conditions that might affect countries', communities' and individuals' abilities to prevent, mitigate, prepare for and respond to hazards (Phillips and Fordham, 2010). While definitions of vulnerability vary from discipline to discipline (Philips and Fordham, 2010), the scope in which vulnerability is explained by many refers to the following classifications:

- Physical vulnerability refers to susceptibilities of the built environment and may be described as “exposure”;

- Social factors of vulnerability include levels of literacy and education, health infrastructure, the existence of peace and security, access to basic human rights, systems of good governance, social equity, traditional values, customs and ideological beliefs and overall collective organisational systems;
- Economic vulnerability characterises people less privileged in class or caste, ethnic minorities, the very young and old, the disadvantaged, and often women who are primarily responsible for providing essential shelter and basic needs;
- Environmental vulnerability refers to the extent of natural resource degradation (Philips and Fordham, 2010; ISDR, 2009; Perrow, 2007).

In 2009, the International Strategy for Disaster Reduction (ISDR) provided a definition of vulnerability as the characteristics and circumstances of a community, system or asset that open it up to the possibility of being damaged by a hazard. Indicators of vulnerability may place focus on a shortage of public information and a limited amount of official recognition of risks and preparedness measures. This indicate that lack or limited preparedness to the occurrence of hazard. According to several sources consulted, hazards may be classified as shown in Table 2.1.

**Table 2.1: Classification of Hazards**  
(ISDR, 2009; Perrow, 2007)

Biological	Geophysical	Hydrological	Meteorological	Climatologically
<b>Epidemic:</b> Viral Infectious Disease. Bacterial Infectious Disease. Parasitic Infectious Disease. Fungal Infectious Disease. Insect Infestation. Stampede.	Earthquake Volcano <b>Mass Movement (Dry):</b> Rock fall Land slide Avalanche Subsidence	<b>Flood:</b> General Flood. Flash Flood. Storm Surge/ Coastal Flood. Mass Movement (wet): Rock fall. Land slide. Avalanche. Subsidence.	<b>Storm:</b> Tropical Cyclone. Extra Tropical Cyclone. Local Storm.	<b>Extreme Temperature:</b> Heat wave Cold wave Extreme winter condition <b>Drought</b> <b>Wild fire:</b> Forest Fire Land Fire

Table 2.1 shows the relative importance of understanding each of these hazards varies from region to region and within countries because of geological, geographical and meteorological variations, and also according to the different mitigation and response strategies that may be in place in each country because of geological, geographical and meteorological differences. These can vary significantly, but their occurrence may have similar impacts when they occur in major magnitudes (Coppola, 2011). As noticed in Table 2.1, hazards such as flood, storm and fire are more common, which Alexander (2002) also confirmed.

But in the UAE, hazard events such as earthquakes, landslides, health epidemic, tornadoes, tsunamis etc. are less common (Perrow, 2011; Coppola, 2011). Should any of these hazard events occur in large-scale to the extent that international aid and support are required by the country where it has occurred, then they are considered disasters. Regardless of the scale and level of escalation, Coppola (2011), Alexander (2002) and Haddow et al. (2011) agree that an emergency may be naturally occurring or man-induced. This means that all emergencies listed above are either natural or man-made, indicating that there are two broad types of emergency or disaster.

It can be observed that emergency or disaster in this context refers to a crisis situation which exceeds the regular response capabilities and which can cause wide spread damage and make recovery difficult (Quarantelli, 1989). Therefore, MEs as derived from the explanation thus far are ones which are difficult to effectively manage using resources and efforts for routine emergencies to prevent the loss of lives and properties (Alshamsi, 2014). This understanding is significant in that, it clarifies that approaches for managing emergency or disaster ought to aim at understanding and preventing their causes (Haddow et al. 2011). But in the case of natural emergency or disaster, their management need to be structured to deal with their unpredictable nature (Coppola, 2011).

Based on these explanations, emergency and disaster management is known as a multi-disciplinary field that draws largely from management concepts. According to EMA (1998) emergency management is considered as the organization and management of resources for dealing with all aspects of emergencies. Emergency management definitions in the glossary and ones provided by authors such as Alexander (2002) Coppola (2011) and Haddow et al. (2008; 2011) focus and emphasize the importance of the four phases which are mitigation, preparedness, response and recovery. These phases are considered as a continuous process of where organizations and resources work

together to improve efforts for lessening the impacts of emergencies or disasters on the community. Figure 2.1 shows the phases and the process with emphasizes of red colour on response phase.



**Figure 2.1: Emergency Management Cycle**

**Adapted from Alexander (2002); Coppola (2011) and Haddow *et al.* (2008)**

Figure 2.1 shows that the phases are a continuous flow from one to another without any breaking point. According to Regester and Larkin (2008), the four-phased principle of disaster/emergency management is a continuous flow of resources, communication, systems between agencies which are managed in the most effective way. The four-phase are mitigation (reduction or prevention), preparedness (readiness), response and recovery (rehabilitation) (Alexander, 2002; Canton, 2007).

Different terminologies are used by different countries based on the design of their emergency or disaster management standards, but in principle, the activities conducted at each phase are similar. For example, the United States (US) use mitigation, preparedness, response and recovery (MPRR), while Australia uses prevention, preparedness, response and recovery (PPRR). New Zealand on the other hand use “4Rs” which is reduction, readiness, response and recovery.

However, countries which have suffered from a major devastating disaster often divide their recovery efforts into two stages which then gives them recovery and rehabilitation (Alexander, 2006). Thus, it can be seen that the scale and impact of the disruptive event determine if it is an emergency or disaster and the extent to which the phases are operated in practice. Haddow et al. (2008) emphasised that the emergency management phases are all important and activities of each phase often influence actions in other phases. The sets of activities undertaken at every phase of emergency management are listed in Table 2.2.

**Table 2.2: Emergency Management phases and activities**

(Haddow et al., 2008; Dillon et al., 2009)

<b>Disaster Phases</b>	<b>Activities</b>
<b>Prevention/mitigation</b>	Building codes, Building-use regulations, Legislation, Public education, Public information, Tax incentives/disincentives, Insurance incentives/disincentives, Zoning/land-use management
<b>Planning/Preparedness</b>	<b>Emergency response plan, Warning systems, Evacuation plan Emergency communications, Mutual aid agreements, Public education, Public information, Resource inventories, Training programs, Test exercises, Refuge shelters</b>
<b>Response</b>	<u>Plan implementation, Emergency declarations, Warning messages, Public information, Registration and tracing, inform higher authorities, activate coordination centres, Evacuation, Mobilise resources, Damage assessment, Search and rescue, provide medical support, Institute public health measures, Provide immediate relief</u>
<b>Recovery</b>	Restore essential services, Counselling programs, Temporary housing, Financial support/assistance, distribute recovery stores, Public information, Long-term medical support, manage public appeals, Restore public assets, Economic impact studies, Review development plans, Initiate reconstruction tasks

It can be seen in Table 2.2 that activities required at every phase of emergency management are crucial, important but also different. A careful consideration of this table shows that planning and documentation of plans take place in the preparedness phase (activities in bold), while the planning activities and plans are implemented at the response phase (activities underlined). This distinction clarifies the scope of this research as being in the preparedness phase, while ensuring that measures and planning are put in place for managing ME are properly implemented at the response phase.

All activities in the response phase are actually planned during the preparedness phase through its activities. Given this distinction between the preparedness and response phases, it can be inferred that the conceptualising an ME as either an event or a process can be realistically accommodated within the premise of emergency and disaster management. This justifies the focus of this research on contingency planning and not on contingency plan, since the contingency plan is included as part of the planning process; planning is more comprehensive than simply having a plan. While this explains, and justifies the need for a contingency planning, it is important to examine the theoretical explanations for MEs in order to better understand the rationale for contingency planning in literature.

### **2.2.2 Theoretical explanations for Major Emergencies**

In the literal sense, an inability to effectively manage MEs exposes inadequate and sloppy preparedness measures (Byman, 2005). To this end, Turner (1978) explains that it is more appropriate to understand the stages an event progresses through before its occurrence has major impact. Turner and Pidgeon (1997) further explain these stages of disaster as featuring a failure of foresight that inhibits the ability to plan adequately since disasters or disruptive events have an “incubation period” that provides characteristics and signals of potential or imminent danger. They argue that rather than preparing, organisations or people typically misinterpret, overlook, or accumulate unsafe practices that make the onset of the event even more catastrophic and its impact more severe. The stages explained by Turner and Pidgeon (1997) are outlined in Table 2.3.

**Table 2.3: Stages of disaster & system failures (Turner and Pidgeon, 1997)**

<b>The sequence of Events Associated with a Failure of foresight</b>	
<b>Stage I</b>	<b>Notionally Normal Starting Point:</b> a) Initial culturally accepted beliefs about the world and its hazards b) Associated precautionary norms set out in laws, codes of practice, mores and folkways
<b>Stage II</b>	<b>Incubation Period:</b> the accumulation of an unnoticed set of events which are at odds with the acceptance beliefs about hazards and the norms for their avoidance
<b>Stage III</b>	<b>Precipitating Event:</b> forces itself to the attention and transforms general perceptions of stage 2
<b>Stage IV</b>	<b>Onset:</b> the immediate consequences of the collapse of cultural precautions become apparent
<b>Stage V</b>	<b>Rescue and Salvage – First stage adjustment:</b> the immediate post-collapse situation is recognised in ad hoc adjustments which permit the work of rescue and salvage to be started
<b>Stage VI</b>	<b>Full Cultural readjustment:</b> an inquiry or assessment is carried out, and beliefs and precautionary norms are adjusted to fit the newly gained understanding of the world

As outlined Table 2.3, the Stage I is characterised by failure to comply with existing regulations, or what de Marchi (1995) explained as the inability to learn lessons. This then affects the ability to actually manage or prepare for the possibility of the event becoming extreme in Stage II. However, at Stage II, more activities or events would have accumulated and gone unnoticed because of misunderstood or erroneous assumptions, unnoticed events, difficulties handling information in complex situations, and fear of the worst (Nakamura and Kijima, 2008). At this stage, the disaster is at incubation, gradually moving to Stage III, or the precipitating event. Here, even though the event must be noticed, it would have transformed the general and normal perceptions from Stage II, making Stage IV, onset of disaster, inevitable (Turner and Pidgeon, 1997).

While it is possible to engage in rescue and salvage (Stage V) at the onset of the disaster, it is expected that full cultural adjustment is carried out at Stage VI so that lessons can be learned and necessary adjustments are made (Nakamura and Kijima, 2008). These learned lessons and necessary adjustments are a prerequisite for preventing future failures of foresight or system failures in dealing with disruptive events. Unfortunately, the impact of MEs can prolong Stage V to the extent that the adjustments, assessments, and lessons

identified in Stage IV are not fully applied before another emergency occurs (Perrow, 2011). Within the context of the theoretical explanation by Turner and Pidgeon (1997), the ME is illustrated as a sequence of stages associated with failure of foresight and lack of adequate planning for managing an ME at the incubation stage. In this instance, the ME is considered as both an event which happens at the onset stage and as an unfolding process that follows sequential stages.

The six stages explained in Table 2.3 suggest that potentially, an emergency of any scale can be understood, planned for, and managed. However, this six-stage model does not link Stages II and III with Stage IV; it does not explain or show how the consequences of the onset of disaster can be prevented and managed at each stage. This gap in the six-stage model in Table 2.3 emphasises the importance of this research, which seeks to understand how the challenges of managing an ME can be overcome by learning from Stage VI, the readjustment stage. This inference shows the potential areas of knowledge this research will contribute to. Despite this gap, the explanation offered by Turner and Pidgeon's (1997) six-stage model provides a context for MEs and the need for more predictability of MEs through better preparedness arrangements.

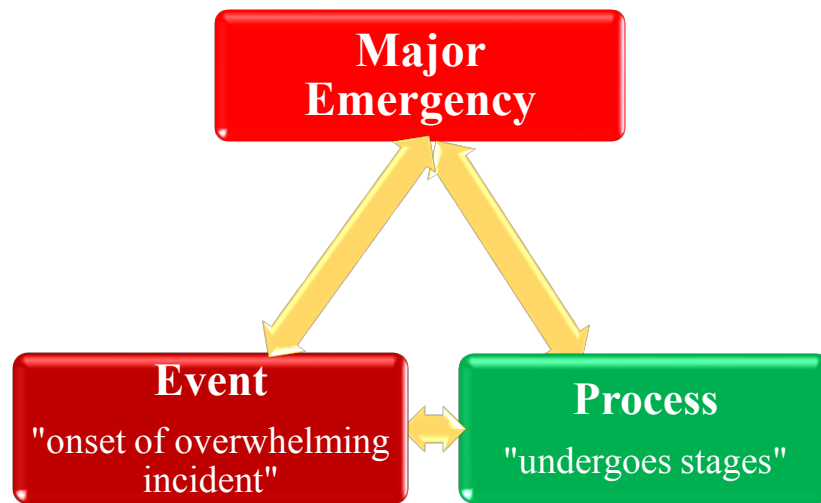
While argument may exist on the possibility of this, the incubation period and sequence of events in the six-stage model strongly indicate that predictability is instrumental to better understanding of characteristics of ME. Being able to predict and learn from past events also encourages an ability to conduct safe acts, to handle information in complex situations better, and to institute precautionary measures at the 'incubation period'. Turner emphasised the need to better maximise the incubation stage by stating that instead of utilising the stage for better planning arrangement, rather is usually characterised by:

*"the accumulation of an unnoticed set of events which are at odds with the accepted beliefs about hazards and the norms of their avoidance"* (Turner, 1976:381).

This highlights that while there is a failure of insight, the incubation period provides opportunities for readjustment and precautionary measures to be put in place in view of MEs. However, levels, scope and legislative guidance for what constitutes a disaster, emergency or crisis vary from country to country and this often influences the measures taken to prevent their consequences (Perrow, 2011). Therefore, the theoretical explanations of an ME emphasise the understanding, planning for and management of ME as both an event which occurs regardless of ability to predict its occurrence, and as a



process which undergoes six stages explained by Turner and Pidgeon (1997). The interaction between these concepts is illustrated in Figure 2.2.



**Figure 2.2: Theoretical explanation of Major Emergency**  
(Adapted from Turner & Pidgeon 1997; Mitroff, 2004)

The diagram in Figure 2.2 illustrates that the ME has a tendency to be managed as an event that is overwhelming at its onset or as a process where different events undergo stages that lead to the ME. Despite the explanations by Turner (1976; 1978), Turner and Pidgeon (1997), Mitroff (2004), and Jacques (2010), an ME, whether managed as an event or process, may exhibit challenges that are overwhelming due to the previously explained coordination problems (see section 2.2) proposed by McMaster and Baber (2012). Thus, every emergency, regardless of its size, requires that certain measures are put in place at the preparedness phase in order to manage the onset of the emergency (Dillon et al., 2009). The explanation of an ME as a process further supports the relevance of early detection of the “incubation period” and the need to better utilise this stage for better planning. The next section examines the concept of contingency planning, which is one of the research themes, as well as providing background on the emergency management preparedness phase.

### **2.3 Concept of Contingency Planning**

This section provides background into emergency management preparedness phase and the explanation of contingency planning. According to Mitroff, (2004) events that tend to

cause disruption are sometimes treated as either a process or as an event; they are seldom treated in a complementary manner as both a process and an event. This argument indicates that an ME, as an event, can be adequately managed with a plan (Alexander, 2002); however, approaching an ME as a process means that plans might be insufficient, thus emphasising the need for ongoing risk assessment which informs the planning process (Dillon et al., 2009).

Emergency or disaster preparedness is considered as the series of decisions, plans, activities, and exercises undertaken to ensure good readiness for any incident, emergency, or disaster (Coppola 2011). According to Alexander (2002), the activities of this phase of emergency or disaster management is heavily based on the risks or threats which have been identified. The preparedness phase is vital for equipping organisations, the community, and stakeholders so that they can be ready for an emergency (Dillon et al. 2009). If the preparedness phase or contingency planning is insufficient, the response to an emergency will be ineffective or inadequate (Edwards and Goodrich, 2007).

As shown in Table 2.2 the preparedness phase includes activities like developing and testing emergency response plans, instituting warning systems, and designing evacuation plans and procedures (Dillon et al. 2009). Other activities in the preparedness phase include developing mutual aid agreements with partners, educating the public and dissemination information, conducting resource inventories, etc. (Haddow et al. 2008). Planning for an extreme event requires effective planning with sustained commitment from several organisations to determine the capabilities and resources required for managing an ME (Andrew and Carr, 2013). According to Alexander (2002), planning is a necessary process for managing emergencies and disasters (Alexander, 2002); it is a process that is subjected to a wide variety of different activities designed to determine capability of responding to emergencies when they occur (Boin and Lagadec, 2002). Proud (2007) explains that that planning process can also be limited by planners' personal experiences and by resources, practices, time, interventions, and policies which govern planning for disasters.

Based on the activities carried out during the preparedness phase, it can be observed that the aim of this phase is coordinating plans and planning arrangements with other organisations that are required to be part of the response (Alexander, 2002). Those who may be affected by the impact of the emergency when it occurs are also involved in the

preparedness phase with the aim of encouraging them to be prepared for emergencies that are likely, or can be foreseen, based on risk assessment (Alexander, 2002). Hence, considering the ME as an unpredictable, large-scale event that may occur as on overwhelming incident or as an event that goes through stages warrants planning that is more comprehensive, such as contingency arrangements which are often put in place for dealing with complex and large-scale incidents (Jaques, 2007). *Contingency arrangement*, in this context, refers to proactive planning to prevent, control, contain and manage an extreme and complex event (Bruins, 2000).

Contingency planning therefore anticipates potential crises so that plans can facilitate timely selection of courses of action and execution are pre-determined and decided ahead of the onset of the incident (Coombs, 2007). Explanations from previous sections favour the position that ME may occur in overwhelming magnitude and with cascading effects that exceed normal planning interventions (Perrow, 2011). Despite this, Bruins (2000) and Coombs (2007) strongly suggest that MEs can be better managed, and their impact mitigated or contained. While Jaques (2007) argues that complex and extreme incidents (MEs) occur in unique scenarios and often in an unpredictable manner, Coombs (2007) and Bryman (2005) explain that with complex and extreme incidents, the level of impact suffered can result from a lack of planning and a lack of contingency plans for responding.

Mitroff (2004) states that the limitations and challenges of managing incidents like MEs lies in the attempt to treat incidents of this nature as either a process or as an event, but emphasised the need to plan to manage ME as both. Roux-Dufort (2007) justified the effectiveness of managing crisis in organisations as a process that is continuously monitored. Although organisational crisis does not reflect the true scale of societal incidents, this research seeks to adopt this context for explaining MEs and how they can best be managed. This explanation is adopted because the process-orientated approach helps to inform both theoretical explanation and practical implementation of crisis management irrespective of its scale (Roux-Dufort, 2007). Explanations that favour the need to understand the dynamics of emergencies and that include characteristics like complexity, extreme, severe impact, and magnitude further propel the relevance of contingency planning as one of the suitable mechanism and process for dealing with ME. This background provides context for contingency planning, but the next section focuses on explanations for and on contingency planning in relation to MEs.

### **2.3.1 Contingency Planning Explained**

This overview of contingency planning suggests the need to be prepared to contain and manage the consequences of extreme or complex events that cannot be prevented, ensuring that preparedness focuses on all areas, including worst case scenarios. For example, managing and preventing the spread of a fire in an office space located within high-rise building housing 500 occupants is a crisis which can be managed with normal response interventions. However, there is need to prepare to manage the potential consequences of this event if the fire was not contained. A plan to manage the cascading effects of the fire spreading to other areas in the building, which is a possibility, is needed. Within this context, insufficient planning or lack of contingency planning can make the response to extreme events challenging, if not impossible.

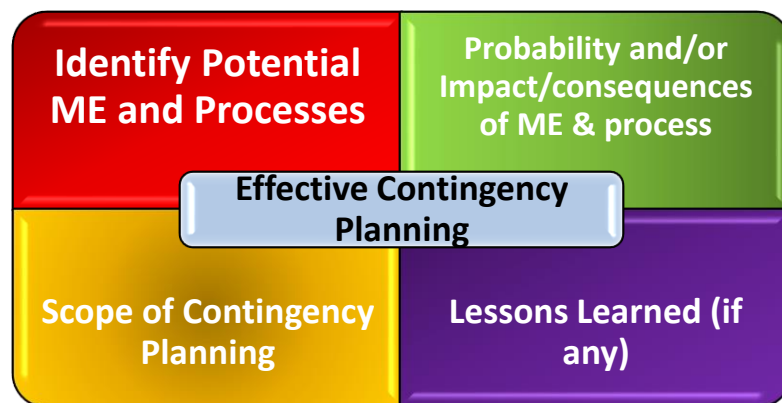
While lessons of past extreme events point to the need to improve responses to emergencies or in this case, to MEs, they also indicate how routine emergencies like motorway accidents can quickly evolve to complex events when planning and response is insufficient (Jaques, 2010). Therefore, contingency planning provides guidance for managing an ME by defining the capabilities, resources, and abilities to coordinate responses to foreseen and unforeseen events (Knight, 2001). However, Andrew and Carr (2013) argue that contingency planning involves creating plans in anticipation of future extreme event(s) based on learnt lessons and information which can be used to mobilise appropriate resources.

This means contingency planning is undertaken before an incident occurs, under conditions which are not extreme and evaluated through exercise, training and refined overtime (Meyers, 2011). Therefore, effective contingency planning can be considered as one which is capable of utilising learnt lessons to inform the process required for contingency planning. However, the review, analysis and evaluation of learned lessons, the nature of ME and the challenges of managing them all emphasise the need for continuously asking “what if” questions based on probability and impact (Lerbinger, 1997).

For instance, Meyers (2011) explained that events require interventions that align with planning requirements, have well-developed action plans for threats or other scenarios, but which can be rapidly modified by planners to ensure transition from normal situations

to situations of heightened threats. This explanation is particularly true since MEs do not often signal the extent of their consequences (Rosenthal et al., 2008). Based on such tendencies, there is a need for contingency plans and contingency planning to contain chains of activities which can facilitate timely transition and selection of response actions that will be effective for MEs (Meyers, 2011).

Therefore, it can be inferred that effective contingency planning should recognise trends of ME and ensure that adequate resources are mobilised which can sufficiently manage triggers of extreme or complex events (Mitroff et al., 1996). The essentials of effective contingency planning and elements as identified from the arguments in this chapter are illustrated in Figure 2.3.



**Figure 2.3: Elements of effective contingency planning**  
Adapted from Meyers (2011); Mitroff et al. (1996); Andrew and Carr (2013); Coombs (2007)

Figure 2.3 shows the essential elements of effective contingency planning as identified from the line of argument presented in this chapter thus far. Elements such as need for, or ability to identify potential ME and processes, probability and impact or consequences of ME and process, lessons learned and scope of contingency planning. Identifying potential ME and processes is important starting point for determining the extent, resources and level of preparedness that will be required. For instance, different hazards have peculiar manner in which they are responded to and dealt with. Understanding of hazards and risks that tend to cause ME will influence ability to determine the probability and consequences that need to be mitigated, reduced and eliminate.

As mentioned earlier in this chapter, lessons learned are important and can serve as good background to assessing and understanding the extent of planning and response arrangements required for contingency planning and its scope. Section 2.2 clarified that ME have their characteristic and may occur in stages as understood from its theoretical explanations. Therefore, this puts identifying potential ME as a vital element of effective contingency planning. This element leads to the second one which is identifying or determining the likelihood and/or potential impact of ME should it occur; this stage is vital to defining the scope of contingency planning arrangement, of which lessons learned from past ME can also strengthen the content of contingency planning.

Proud (2007) states that there are problems and challenges associated with planning which limits the process, Moynihan (2008) emphasized that planning improves communication when it is formalised. According to Smith and Elliott (2006), communication motivates and ensures that better decisions are made through strategic and formalised planning and this provides clear goals and directions for managing future disasters. Continuous reference to communication by Moynihan (2008) and Smith and Elliott (2006), indicate that effective contingency planning will require elements and actions which can be carried out through communication. This also makes strategic planning which entails communication, one of the ways in which future problems and ME can be anticipated and prepared for (Quarantelli, 2004).

While it has been indicated that, contingency planning can help to mitigate the impact of ME (Coombs, 2007), strategic planning also plays a role in helping emergency planners coordinate the scope of contingency planning and ensure appropriate preparation for ME. The ability to combine the chain of activities for planning process and trends of ME can also give an edge to being able to predict the onset of ME. While ability to combine chain of activities can also help to plan strategically for ME, the challenges for managing ME need to be identified in order to better prevent factors that trigger the extreme characteristics of ME (Jaques, 2010). According to Lagadec (1997), when problems converge rapidly and with similar dynamics as past events, it can provide indication or early warnings to the onset of incidents of similar scope.

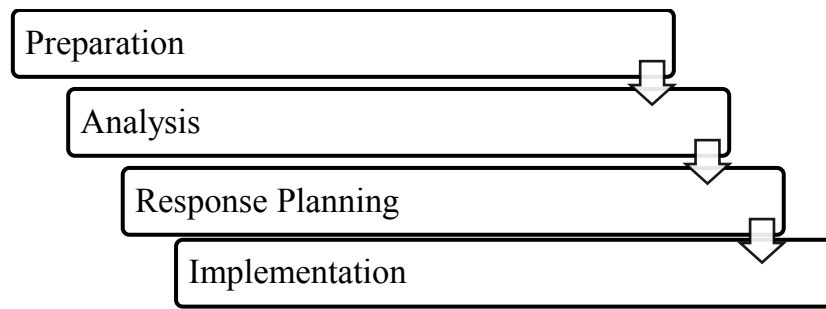
However, the failure to recognise, prioritise and mobilise interventions to contain and manage such indications or early warning is what Bazerman and Watkins (2004) called predictable surprises. Bazerman and Watkins (2004) explained that oblivion to any indication of looming danger or crisis can cause devastating disasters. Hence, it can be

inferred that effective contingency planning for unforeseen ME is one which is able to incorporate interventions for incubating period of ME to the onset of events based on trends of ME which have been identified. However, this is highly influenced by the learning mechanism for past events and the responsibility of leader(s) and decision-making mechanisms in place to determine the best way to utilise lessons learnt.

### **2.3.2 Roles of effective Contingency Planning in MEs**

Emergencies and disasters are known to occur at any time because of human error and/or through human activities, or they can be naturally occurring events (Haimes, 2009). In this regard, the role of emergency planning in general is to reduce the chances of these emergencies happening (Alexander, 2002). However, in the event that they are unpreventable, the aim of planning focuses on reducing the impact of emergencies on people and the environment. While planning is based on identified and prioritised risks peculiar to certain areas, contingency planning can be generic in view of any emergency occurring on a larger scale or extreme complexity (Knight, 2001). Therefore, effective contingency planning is considered as a dynamic process which helps to determine which organisations to engage and how to engage them for both planning for and response to extreme disasters (Alshamsi, 2012).

As explained in previous sections, contingency planning does not exist in isolation, but in relation to foreseen ME which may happen. Although UNHCR (2011) states that some scenarios might not occur, scenario-based planning which informs contingency planning still helps to approach planning from a more operational perspective. Essentially, contingency plan contains response strategies in addition to some basic concepts which can be activated or used to trigger mechanisms for emergency coordination and to determine what should be prioritised for more effective response to ME. Hence, contingency planning is process-driven, include regular updates but easy and simple to implement (Choularton, 2007). According to UNHCR (2011), contingency planning process can be conceptualised into four basic steps:



**Figure 2.4: Steps for Contingency Planning (UNHCR, 2011 p6)**

Figure 2.4 presents contingency planning as a process where preparation leads to analysis, response planning and implementation of the preparedness activities. These basic steps link the role of effective contingency planning with ensuring that preparedness activities involve monitoring, coordinating and preparing for the event and with a process that ensures the context and scenarios that may occur are effectively managed (UNHCR, 2001). However, this can only be done by achieving the aim of emergency preparedness through readiness measures that can expedite response, rehabilitation, and recovery based on timely and result-driven assistance for the people prone to its impact (Alexander, 2002). The expected outcome provides a focus for the entire preparedness phase as a continuous process which is integrated from a wide range of activities and resources and which requires contributions of different organisations, stakeholders, and resources, inclusive of contingency planning.

Thus, while the concept of preparedness covers measures aimed at enhancing safety when an emergency occurs (Haddow et al., 2006), effective contingency planning helps to create a synthesis between preparation and analysis of ME hazards and risks (Choularton, 2007; Alshamsi, 2012). This synthesis is possible by identifying the triggers and early warning indicators of events at Turner and Pidgeon's (1997) Stage I, the Notionally Normal Starting Point. Synthesis is also required during the planning stage as is being able to identify the incubation period of extreme events when they are about to occur (Birkland, 2006). This makes effective contingency planning crucial to response strategies and to the coordination of arrangements and implementation of preparedness procedures. However, Birkland (2006) argues that the relationship between concepts of preparedness and contingency planning are important for ensuring that the role of contingency planning is effective enough to prevent and help deal with ME.



Understanding the relationship between preparedness activities and contingency planning is also central to ensuring that response strategies are activated and so that responsibilities of response operations are carried out well in response to a specified ME (Choularton, 2007). However, being able to understand this relationship as well as the role of effective contingency planning is based on ability to learn from patterns and dynamics of past ME and having in-depth understanding of risks and hazard management in built environment. In view of this, the next section provides background into emergency and disaster management in a built environment like UAE and it also examines the current practices in place to manage disasters and emergencies.

## **2.4 Background to Major Emergencies in UAE**

The United Arab Emirates (UAE) formally called the Trucial States is a federation of 7 states (Abu Dhabi, Ajman, Dubai, Fujairah, Ras al-Khaimah, Sharjah, Umm al-Quwain) in the Arabian Gulf which borders the Saudi Arabia and Oman. The UAE was formed in the 1971 and the last state joined the union the following year. The country purchasing parity is quite high and with its strategic location, the country has continued to remain one of the most important trading hubs in the world.

The UAE like most countries in the MENA (Middle East and North Africa) region, experience hot weather conditions and are largely desert areas (Dhanhani et al., 2010). The implications of this is that, from time to time there are harsh weather conditions that might disrupt regular economic and social life in the country. The UAE in particular is located at the ‘horn’ of the gulf, a location which makes it prone to various weather patterns that are caused by the convergence of various wind and air conditions from sea and land.

Another implication of these natural activities is that, there are harsh weather conditions from time to time, thus triggering severe weather conditions like storm, cyclone, fog, sandstorm, and other weather-related hazards. Thus, the UAE like many countries across the world have been experiencing emergencies in extreme or complex nature. For instance, four severe emergencies amongst others which occurred between 2008 and 2014, have been selected for evaluation in this chapter because of their peculiarity and unprecedented nature, complexity and severe impacts.

Characteristics which present them as ME, which are also characteristics already examined in the previous chapter as peculiar to ME. The research justification (section 1.3) provides more background to the nature, dynamics and impacts of ME in the UAE leading to embarking on this research. During the course of carrying out this research, other events have also occurred which justify the need for this research, its relevance, and the importance of proposing guidelines as recommendations for effective contingency planning.

As clarified in the previous chapter (section 2.4) there are organisations responsible for planning for and responding to the routine emergencies as well as ME. However, the continued occurrence of these events and their impacts suggest that certain things are wrong despite the attempts and steps taken by the government to support equipment purchase, personal development and education overseas of emergency managers in the three main organisations saddled with the responsibilities of emergency preparedness and response. Therefore, the next section evaluates current practices in the UAE for dealing with emergencies and MEs.

#### **2.4.1 Overview of Current Practices in UAE**

The United Arab Emirates (UAE) is not immune to the occurrence and impacts of hazards and risk. In reaction to this, the UAE established legislation, procedures and developed plans and put in place measures aimed at protecting the country, people and environment (Kumar 2013). In this context, it can be said that the UAE leads the Gulf region countries in taking initiatives in establishing authorizes, legislations and measures to protect the country and people. An evident of this is the establishment of the National Emergency, Crisis and Disaster Management Authority (NCEMA), which was created by a federal decree with a mandate to coordinate all efforts, locally, federally, regionally and internationally (NCEMA, 2007). The purpose of all tier and all level coordination at all governmental levels is to ensure that there is collaboration, measures are effective and efficient enough to combat all threats and risks (NCEMA, 2007).

Despite this arrangement, some threats have proven more difficult to predict and avoid (NCEMA, 2007), therefore leaving the response to them and mitigation of their impacts as the only options. This challenge to dealing with ME and unpredictable events emphasizes the importance of contingency planning in the UAE. Key Federal ministries,

authorities and emergency response agencies have specific and major roles and responsibilities to prepare for and respond to emergencies, and crisis (Kumar, 2013). However, NCEMA has the mandate to coordinate the system, its efforts and resources within the UAE so that the mechanisms for achieving the goal of emergency management can be achieved (NCEMA, 2007). This has been done because of the disruptive nature of emergencies and disasters.

According to EMA (1998), disruptive events can be explained using different terms such as incidents, emergencies, disasters, accidents, crisis to mention a few depending on the scale, number of organizations involved, coping capacities and preferred terms selected by each country. For example, a country like UAE uses the terms crisis, emergency and disaster to describe events which can cause or causes significant disruption to the public. Within the UAE context emergency is defined as:

*“Any major incident or incidents resulting in serious damage to individuals or properties, or threatens the general order, the continuity of government functions, the safety and health of the population, the environment, or threatening the economy, and which requires special mobilisation and coordination between multiple agencies”* (NCEMA, 2007p.18).

This definition provide context for what is considered emergency in the UAE, even though definitions in countries such as United Kingdom (UK) and Australia specify events as well as emphasising that emergency in their countries can be an actual or imminent event (EMA, 1989). This nature of definition in Australia and UK emphasises the preventive approach and perception of what constitute an emergency. The vagueness and the generic perception of what constitute emergency in the UAE further emphasises the need to be better prepared for both actual and imminent events as proposed by this research. Other terms defined in the UAE which relates to this research are; disaster, crisis, preparedness, prevention and protection.

Disaster within the UAE context is considered as any incident(s) causing very serious damage, and which require the cooperation of the government and society as a whole in order to achieve recovery, and may require the support and help of the international community (NCEMA, 2007). This definition shows that incident(s) which are considered as disaster in the UAE is similar to the definition by international agencies such as the Red Cross and Red Crescent, which all emphasise the need for external interventions.

This is because disasters are sometimes unplanned devastating event that causes severe damage to mankind, environment and which exceeds the capacity of local response but requiring external support from other countries to manage (Haddow et al, 2006).

Thus, within this context, disasters are not common in the UAE, but emergencies which require the response of emergency response agencies, authorities and government ministries. Crisis is therefore defined in the UAE as incident(s) that are more complicated than an emergency, and which threatens the stability of a large portion of society, and which affects the ability of government to carry out its functions (NCEMA, 2007). As explained in this definition, governmental support, facilities and actions will be paralysed should a crisis occur since it is an event which prevents the functioning of government ability (Kumar, 2013). The importance and relevance are also emphasised from the potential impact of crisis in the country. However, like the international process of managing emergency, the UAE possess similar model. Although not a cycle, the emergency and crisis management framework indicate the process and flow of phases for managing incidents. Figure 2.5 illustrate the phases of crisis and emergency management as practiced in the UAE called the four pillars of crisis and emergency management.



**Figure 2.5: The Four Pillars of Crisis and Emergency Management (NCEMA)**

Figure 2.5 shows the interaction through the use of red arrow to illustrate the connection between prevention and protection phase to preparedness, which leads to response and

then to recovery, and then back to prevention and protection. While the framework divided the phases into two main sectors; prevention and protection and preparedness into before crisis or emergency stage, it also divided response and recovery into after crisis or emergency stage. Essentially, the phases are still the same and the activities in each phase have also modelled international standards for practicing emergency and disaster management. In the UAE context, the phases of crisis and emergency management are given the corresponding meanings shown in Table 2.4.

**Table 2.4: Emergency and Crisis Management phases and meanings in UAE (NCEMA, 2007)**

<b>Phases</b>	<b>Meaning and context</b>
Prevention and Protection	Activities that aim to remove the causes of the emergency, crisis, or disaster and reduce its probability. This involves a number of actions such as threat and risk assessment and establishing priorities, proposing necessary legislation, and the undertaking of all security and preventative measures by all concerned agencies.
Preparedness	Taking the procedures related to preparing resources, capabilities, and plans to respond to emergencies, crises and disasters that might occur in the future. This stage includes developing, co-ordinating and training on the National Response Plans.
Response	All procedures taken as a result of an emergency, a crisis, or a disaster, mitigating their effects and offering aid and support for society.
Recovery	All actions and procedures taken after an emergency, crisis or disaster, aiming at re-building affected infrastructure and returning all aspects of life to a normal state. This stage consists of short-term, intermediate and long-term procedures and measures.

Therefore, based on the definitions and understanding of what constitute crisis, disaster and emergency in the UAE, the next section examines the current practices for emergency management in the UAE and its capability for managing ME.

### 2.4.2 Emergency Management in the UAE

The UAE as an emerging economy borrows concepts, best practices and guidance from different more advanced countries in emergency and disaster management. For example, the UAE have adopted the national guidance from the UK for managing emergencies in the country. In addition to this, NCEMA has signed several international emergency management agreements with the UK and other countries such as Italy and the United States of America. The purpose of which is to enable UAE and NCEMA to benefit from international expertise and enable coordination of scientific, technical and human efforts in confronting emergencies (NCEMA, 2007).

The UAE possess Standard Operational Procedures (SOP) to ensure that Integrated Emergency Management (IEM) is effective. The SOP outlines the requirement for effective emergency management and contains requirements such as:

- Accidents/Incidents management and leadership levels
- Requirements for accidents and incidents management, which demonstrate how operation rooms utilise GPS while responding to reported accidents
- Communications arrangements
- First responding teams
- Response time (standard time is 6 -8 minutes as per NFPA)
- Supportive bodies
- Authorisation, decisions, rules and regulations issues
- Standard operating procedures, methods and requirements for life and safety code of practice
- SOP's includes all types of emergencies and ways to deal with:
  - Manmade disasters
  - Accidents of different sizes and types
  - Other accidents
  - According to approved risks record/log book (Hamdan, 2012; Dhanhani et al., 2010; NCEMA, 2013).

It can be observed that the SOP does not possess include arrangement for dealing with extreme events even though it states accidents of different sizes and types, case studies of past accidents and incidents proved otherwise. Furthermore, the generic discussion of

emergencies emphasises the need for a better understanding of what constitute extreme disasters and the relevance of having contingency planning to deal with them. Although having the SOP is commendable, the current practices in the UAE for emergency management places major responsibilities on certain organisations.

The organisations responsible for emergency management, especially response are the police (who are the first point of contact for any event), the Civil Defence, NCEMA, Red Crescent, Army, ministry of health. These agencies and organisations are the core emergency response agencies. The Army and Special Forces might also be required for join response in the event of a ME or crisis. The municipality, International Humanitarian City (IHC), department of public relations, department of immigration, environment, utilities and women committee all provide facilities and support roles during response. Table 2.5 outlines the basic responsibilities and roles of organisations for emergency and crisis management.

**Table 2.5: Duties of emergency response agencies and other organizations in UAE (NCEMA, 2013)**

<b>Responders</b>	<b>Organizations</b>	<b>Duties/Roles/Responsibilities</b>
<b>Core Responders</b>	1) The police 2) The Civil Defence 3) NCEMA 4) Red Crescent 5) Army 6) Media 7) Ministry of Health	<ul style="list-style-type: none"> <li>- Positive reaction to incidents, crime providing unbiased public justice</li> <li>- Provide awareness plan, programmes,</li> <li>- Safety, prevention, training, technical affairs, conference</li> <li>- Developing and maintaining national response plan</li> </ul>
<b>Stakeholders/ Supporting organizations</b>	1) Emirates foundation 2) International Humanitarian city 3) Department of public relations 4) Department of immigration 5) Environment, Utilities and women committee	<ul style="list-style-type: none"> <li>- Provides facilities, services and operations for local and international humanitarian professional</li> <li>- Helps with incident response and supporting the people</li> <li>- Provide any support, service, or aid required by emergency agencies and the people to ensure safety</li> </ul>

It can be observed that the current practice in the UAE however good, does not include arrangement for managing ME or event, neither is focus given to the preparedness and prevention stage, just the response phase. While the definition of response in the UAE makes it possible for response to be conducted without much attention given to the preparedness phase, it has created a gap which makes this research necessary in order to improve capacity for managing ME.

While it can be argued that, it might be difficult to quickly determine what constitute to ME in each country, or the level of support or expertise required by other agencies to prevent the consequences of an extreme event, it is important to draw understanding from explanations provided in section 2.2 of this chapter. Lack of arrangement for extreme events such as contingency planning is evident in the current practice in the UAE. Even though there is SOP for emergency and crisis activities, and a National Response Framework (NRF), a preparedness framework, or procedure is lacking.

Knight (2001) and Choularton (2007) contingency planning is most effective when carried out along the parameters of a well-defined and functional emergency preparedness framework. According to FEMA (2015) emergency preparedness or planning frameworks presents an important progressive step which describes how levels of government, the private sector, nongovernmental organisations and the public in general work together to build and sustain the capabilities needed to prevent, protect, mitigate against and respond to the threats and hazards.

Furthermore, framework informs processes which can be organised in order to improve the preparedness efforts for a nation (FEMA, 2015). This is also called preparedness system which can be used to influence decision, activities and plans which are used as proactive approach to mitigate the impacts of all types of incidents (FEMA, 2015). According to Andrew and Carr (2013) preparedness efforts are ongoing efforts to ensure safety and collaborative planning which can ensure that risks are mitigated.

The emphasis on mitigation and preparedness and ensuring that preparedness efforts, plans, capabilities are effective and appropriate is due to the nature and complexity of incidents, disasters and emergencies (Perrow, 2011). Andrew and Carr (2013) and Perrow (2011) further state that in the current built environment, any incident can be challenging to manage without the back-up of any framework, systems or coordinated arrangement deployed by competent organisations. With this understanding, the legislative framework



to guide emergency management practices are evident in the UAE, however there is no type of planning which fits the description of contingency planning in the UAE.

While there is preparedness arrangement to respond to normal incidents (Bruins, 2000), the manner in which emergencies have occurred and escalated in the past decade in the UAE indicate the absence of contingency planning. Thus, the need for contingency planning which can be used to mitigate the impact of, prepare for and protect against and respond to the occurrence of extreme incidents when they occur next in the UAE as they have been occurring in the past decade.

The absence of documents referring and outlining the procedures for preparing for emergencies in general confirms the lack of preparedness framework as well as contingency planning. While there is a National Response Framework (NRF) (NCEMA website) which have been developed using the emergency management standard in the United Kingdom, there is no preparedness framework or cycle which guides the planning process. This major gap does not only limit effective planning for normal emergencies or incidents, but ability to initiate effective contingency planning process and develop a contingency plan.

Therefore, the importance of contingency planning does not only justify its relevance to ensuring that ME are effectively managed, but has also helped to identify the gap with the preparedness phase in the UAE. The reasons for this gap identified in the emergency management system may vary. But it is evident that, emergency, crisis and disaster management in the UAE is still at its infancy stage and require strategies which will enable any agency with mandate for responding to incidents to learn from past incidents as well as international best practice in the field. In view of this, the next section examines best practice and mechanisms for learning lessons.

## **2.5 Mechanisms and concept of Lessons Learned**

Learning from past disasters is considered as the ability to identify and embed the practices and behaviours learnt by all organisations, agencies and groups involved in disaster management to improve disaster response (Moynihan, 2008). When explained this way, learning and ability to learn raises the concern about the roles of organisation and the network structure in reducing uncertainty of future disasters through learning

from past ME. Perhaps the ability to effectively understand learning processes and ability and possibility of identifying “learnable” lessons from past emergencies have made learning still an open debate in literatures. For example, Birkland (2009) argued that “lessons learned” from past disasters are “fantasy documents” which reflects the organisational and political factors which hinders effective response to extreme events and which also play a major role in hindering effective learning from disasters.

According to him, the documentation of lessons learned often fails to incorporate the real causes and solutions to disasters but rather it is usually the documentation of the authoritative actors which were the “main hero” during the emergency. To this end, Etheredge (1985) established that the contents of documented lessons can influence the reasons why lessons from the past are used especially when elements of “heroic” act are included showing the major role any authoritative actor played during the event. This argument indicates that content and authoritative actor(s) play important role in determining what lessons are learnt.

However, it might be difficult to over personalise lessons since ME occur in overwhelming magnitudes. Furthermore, “heroes” might be difficult to make out of unprepared emergency responders in the dispensation where social media is used to immediately expose the flaws in managing ME. Clarke (1999) also argued that fantasy documents are created and disseminated mostly for rhetorical purposes for which learning is not derived from them. These two arguments have drawn emphasis to “lessons” and ability to “learn” and the difference between identifying and documenting lessons and the ability to use and learn from the documented lessons.

Thus, it can be inferred from these two arguments that, the problem is not with challenges of identifying “lessons” from past emergencies neither is it from documentation of these lessons, but majorly from the failure to use the lessons identified and use them to be better prepared for future emergencies (Jaques, 2010). To explain this, Brändström et al (2004) outlined that learning can effectively take place through the mechanisms explained in table 2.6.

**Table 2.6: Mechanisms for learning lessons and factors (Adapted from Brändström et al. 2004)**

MECHANISMS	INFLUENCING FACTORS	
<b>MECHANISM 1: Modes of remembering the Past</b>	Can be intentional	Spontaneous
<b>MECHANISM 2: Modes of Utilizing the Past</b>	Cognitive	Political
<b>IMPACT: Effects on Process and Outcomes</b>	Constraining	Enabling

Table 2.6 shows that there are two main mechanisms for learning lesson within emergency and disaster management context. Each have the factors which trigger or influence learning process and the impacts of the two factors differ. As seen in the table 2.6, ‘mechanism 1’ shows that lessons can be learned by intentionally or spontaneously use available modes to remember the past, things that happened in the past (Brändström et al., 2004). This mechanism for learning can good for documenting and ensuring that all concerned stakeholders take on board lessons and issues that went well, issues that went wrong and what can be improved on.

However, this means that it might be impossible to learn when there are no intentional or spontaneous factors to inspire a learning process. Also, the second mechanism which is mode of utilising the past, the process of perception (cognitive) can help the ability to use lessons which have been identified and thereby enabling learning for improvement. Brändström et al (2004) inferred that political factors can also provide modes for learning lessons from the past. According to Jaques (2010), it might be subjective to infer that it is impossible to use past lessons except there are modes or mechanism for using them.

It can also be observed from the table that the impacts of the two mechanisms differ, as learning factors which are intentional and cognitive can be constraining, while learning factors which are spontaneous and politically influenced are considered enabling (Brändström et al., 2004). This explanation infers that while intentional and cognitive lessons are good, they are limited and less enabling as spontaneous and politically influenced factors. Thus, suggesting the importance of combined learning process and factors which are politically or legislatively mandated as a more sustainable and objective way of learning.

Therefore, modes of remembering which are intentionally or spontaneously influenced is more applicable and rational as means of learning lessons from the occurrence of extreme

events. This is because of the “extreme” characteristics of extreme events provide major reference in considering planning for future events of such nature (Bryman, 2005). However, it is the ability to take on board challenges experienced when dealing with past extreme events and using the lessons of those experience to cautiously prepare for future events that actually indicate that lessons have truly been learned. This also indicate that both mechanisms of remembering the past and utilising the past are strong influencing factors in preparing for extreme events (Brändström et al., 2004).

Birkland (2009) also examined the role disasters play in creating opportunities for learning and effecting change. According to him, “learning can only be possible when the activities during the acute phase of disaster and the recovery period are analysed” (Birkland, 2009:148). Change can be inevitable when extreme events gain media attention; the type of attention which routine events do not gain (Perrow, 2007). Such media attention then prompts decision makers to consider lessons presented by the events as one of the priorities for government agenda (Birkland, 2009).

Therefore, the argument presented by Birkland (2009) and Clarke (1999) show that lessons can be learned, ignored or failed to be applied even when the lessons are acknowledged, which does not dispute the ability to learn lessons and the benefits of learning from past disasters. Furthermore, Mitroff et al. (1996), and Pauchant and Mitroff (1992) examined organisational crisis as one which can either lead to successful outcomes and failure. They argued that failed outcomes are as a result of failure to learn lessons and that organisations are prone to make similar mistakes in future when lessons are not learned.

Mitroff et al (1996) argued that a ‘midground’ outcome is an evidence that there was some degree of success as well as failure, which indicates that some learning probably took place, but the ability to disseminate such lessons were problematic. Learning lessons can be lead to successful outcomes especially when an organisation makes the required changes in procedures, policies and systems based on lessons identified from past incidents and applied to future incidents (Mitroff et al., 1996; Pauchant and Mitroff, 1992).

Although Mitroff et al and Pauchant and Mitroff further emphasised that factors such as cultural beliefs and organisational structures can affect perceptions, information dissemination and ability to effectively learn from past disasters, their main argument was

largely based on the ability of organisations to learn from past crisis or incidents. Similarly, Brändström et al (2004) affirmed that crisis is linked through time and that uncertainty and confusion can be solved by conjuring memories and inviting historical comparisons. This shows that, the impact of historical comparisons on processes and outcomes can either be constraining depending on political environment or enabling, depending on the severity of the problem which have necessitated improvement (Eiser et al., 2012).

Despite all the analysis, argument and views presented by all these arguments indicating the possibilities of learning from past events and incidents, the arguments have been based on organisational crisis and not extreme societal disaster. Also, arguments by some of these authors failed to examine crisis within larger society which demands the involvement of several organisations to respond to and manage within limited time and resources such as during major emergency and disaster. It is therefore difficult to determine the extent to which these arguments can inform the modalities for responding and planning for extreme disasters in a larger societal context. This grey area makes this research important as its findings can help to clarify the modalities for planning for extreme societal events.

Brändström et al. (2004) drew emphasis and case studies from past man-made disasters across the world within societal context. Their historical analogies in crisis management were based on the need to have mechanisms which can inform specific impact and not the overwhelming impacts extreme disasters often cause. Recommended mechanisms include modes of spontaneously remembering the past; modes of utilising the past and the impact or effects of the past on policy process and general outcomes (Brändström et al., 2004:171). The specific impacts are expected to serve as indicators which can help to determine if lessons had been successfully learnt or otherwise. While the argument of Brändström et al., (2004) can be applied within the scope of this research, it is however adapted for informing policy makers and increasing their ability to govern states “by looking back” to lessons of past disasters.

This approach is also similar to the stages explained by Turner and Pidgeon (1997) as both emphasis, the development of crisis or emergency as a process that follows a path which trigger event(s) (Pauchant and Mitroff 1992; Turner and Pidgeon, 1997). Therefore, emergency/disaster managers will be more effective if they can and are able

to take pre-emptive action at the early stage of a crisis cycle (Pauchant and Mitroff, 1992). However, the argument by Pauchant and Mitroff (1992) might be challenged by the idea and cultural beliefs that disasters are myths or result of divine wrath from God. Within this argument, learning from past disasters might be considered as impossible since it is difficult to explain or pre-empt divine intervention (Toft and Reynolds, 2005).

Other school of thoughts explain emergencies as purely technical faults which suggest that a basic engineering solution will be sufficient to prevent future incidents of such nature (Toft and Reynolds, 2005). Despite the possibility of incidents arising from human or technical errors (Byman, 2005), it has been observed in the last past decades that the causes of catastrophic or ME are more complex than human and technical errors. The analysis of past ME has also indicated that there are underlying mechanisms which involves social and organisational dimensions in addition to technological factors (Toft and Reynolds, 2005).

These arguments therefore present ME as “one which are better understood by examining complex socio-technical nature and factors as opposed to exclusive technical factors” (Toft and Reynolds, 2005:12). This argument suggests that socio-technical factors can make ME challenging to manage irrespective of good mechanisms of learning from the past and applications of lessons learnt. Therefore, methods which can help to learn from past events must also examine socio-technical factors which refer to the interaction between human behaviours and the complex infrastructures in the society. However, managing the interactions between human behaviours and complex infrastructures can be challenging (Mitroff, 2004). The 9/11 attack can be used as example to show that it can be challenging to learn lessons or lessons are not easily learned.

Leading up to the attack, there were other terrorist bombings that shows that terrorist is able to bomb public buildings in the US. But the inability to learn from trends of incidents such as the bombing of world trade centre in 1993 expose the lack of planning to manage and absence of contingency planning to cope with the consequences. Failure to examine the challenges associated with planning, preventing, containing and managing 1993 bombings and other threats that followed shows the importance of learning lessons from past events in order to prevent future ones. This infers that it is important to learn lessons from past events as well as identify challenges, barriers and drivers associated with managing ME. Therefore, the next section evaluates case studies of ME in order to

understand the logic of stages of ME as well as possibility of learning lessons through spontaneous, cognitive, intentional and politically influenced way.

## **2.6 Global Best Practices and concept of lesson learned**

Previous explanations of ME consider human factors as one of the factors which can escalate the onset of an incident to making it extreme (Ritchie, 2004), while others emphasise it as an event which is rare and with greater magnitude than capacity of emergency organisations (Perrow, 2011). Another explanation considers ME as an event which goes through stages to unfold (Turner, 1978), while ME is also explained as both events and a process (Mitroff, 2004). It can be seen that these explanations do not consider vulnerability of a place as a potential influencing factors as argued by Wisner et al. (2004). It however considers such events as independent ones which occur in great magnitude, beyond expectation and exceeding the response capacity of emergency agencies (Perrow, 2011; Ritchie, 2004; Mitroff, 2004).

Therefore, the explanations of ME appropriately describe the extreme events such Hurricane Katrina in US (2005), highway collision in US and UAE (2014, 2013, 2008 etc.), Tsunami extreme disaster in Japan (2011) and Gloucestershire flood in UK (2007) which has occurred in recent years. While these are some of the numerous ME which have occurred in developed countries with little vulnerabilities, this section evaluates best practice that can be learned from case studies of Japan complex disaster in 2011, multiple chain collision incidents in the US in 2012, earthquake in New Zealand in 2011, and Gloucestershire floods in 2007 in UK.

### **2.6.1 Major Emergencies in Japan**

In 2011, an unusual chain of events occurred in Japan which illustrated the potential impact multiple hazardous events can have on a community and in developed economies. On March 11, 2011, a magnitude 9 earthquake shook north-eastern Japan which unleashed a tsunami and then resulted in a level 7 meltdown after the tsunami (Demetriou, 2011). Japan like many countries rely on nuclear power as source of energy, but the meltdown caused by the impact of the tsunami which occurred after the earthquake has left many homeless (Demetriou, 2011).

The characteristics of the series of events as they unfolded demonstrates the catastrophic effect of ME as a process which started with an earthquake, and then the tsunami which often follows the onset of an earthquake in Japan. However, the tsunami this time would overwhelmed the capacity of emergency organisations and cause death of thousands of people who died from drowning (Demetriou, 2011). In addition to this, the tsunami triggered a level 7 nuclear meltdown after the tsunami, which made response to the disaster more complicated due to the hazardous nature of nuclear properties.



**Figure 2.6: Tsunami impact that resulted from Japan earthquake (Telegraph, 2017)**

Figure 2.6 shows the level of, and wide spread impacts of the earthquake once it escalated into big waves tsunami in different cities close to the coast.





**Figure 2.7: Fire and Flooding that resulted from Japan earthquake (Telegraph, 2017)**

The pictures show that the consequences of ME can be devastating to environment, people and economy, resulting in almost impossible recovery process. The escalation of the ME emphasised the need for better understanding and response planning for future MEs. In reaction to this, Japan has taken stricter safety and precautionary measures since the extreme disasters in March 2011 to keep many of the nuclear reactors in the country closed as part of the stricter seismic safety standards (Oskin 2015). Despite this, the impact of the incident is still ongoing as over 200,000 people are still living in temporary housing because they lost their homes during the disaster in 2011. Earthquake of such magnitude and a large-scale tsunami were not expected in the northern region of Honshu.

However, there was a recognition of the possibility of a big event by some Japanese geologist similar to the one which occurred in Sendai in 869 a decade before the event occurred in 2011 (Demetriou, 2011), but their warnings were not considered by officials responsible for the earthquake assessment in the country (Oskin 2015). The mechanism for learning lessons from past earthquake incidents would have been modes of utilising past incidents, however, political factors was the barrier to actually learning the lesson, constraining the process. The officials responsible for the assessment hazard in the country would have made the difference in being better prepared for the extreme impacts of the ME.

Lessons are currently being learned in Japan and beyond, as tsunami experts from around the world have been requested to assess history of past tsunamis in Japan so that this information can help to improve planning and better predict future earthquake risks in the country (Oskin, 2015). The best practice from this case study is identifying the mechanism for utilising past events as both cognitive and political (with responsible authorities) to enable learning of lessons. A situation which emphasises better and more effective contingency planning and response.

### **2.6.2 Major Emergencies in US**

The US have been experiencing chain-reaction crash or multi-vehicle collision on motorway accidents involving many vehicles, which have been caused by bad weather condition (Pearce, 2012). Although chain-reaction crashes are usually caused by low visibility conditions, they can also occur when there is good visibility (Pearce, 2012). However, most of the severe accidents in the States have been caused by heavy fog, snow, dust storm, floods and heavy rainfall and have occurred frequently in different scales in USA. In November 22, 2012, there was a chain-reaction crash in Texas USA caused by fog. The event involved over 100 cars, 100 people injured and 2 deaths (Pearce, 2012). While chain-reaction accidents are common in the USA, they occur in unpredictable scale depending on weather conditions and regardless of warning signals put in place.



**Figure 2.8: Accidents caused by Fog (Kuo, 2012)**

The pictures of the accidents (Fig 2.8 and 2.9) show the potential impacts of ME when it escalates and without contingency planning. From the pictures, there are disruptions to services, normal and free movement as well as human impacts.



**Figure 2.9: Direct human impact and disruptions caused by the Accident (Kuo, 2012)**

The potential disruption and impacts of future MEs emphasised the need for lessons learned and mechanisms for application. As way of learning lessons, remembering the past is used as the mechanism for learning lessons for this type of incidents. The influencing factor for this is intentional and spontaneous based on the immediate effect such collisions have on the road, on people and the economic activities in general. As a result, preventive measures have been taken as form of contingency to minimise and prevent further collisions.

Some of the measures include traffic signs, road surface markings to help drivers see where possible, having opposing lanes of traffic with wider central reservation to prevent cross over incidents, having concrete barriers and clear road markings and signing which are helping to improve safety on the road. For example, the greatest risk reduction and cheapest is speed reduction. However, individuals can also be held liable financially for the consequences of an accident, property damage, and injuries to passengers, drivers and fatalities (Copeland and Overberg, 2015).

Lessons learned are ongoing, but based on intentional factors using the mechanism of remembering events. Since the events are annual in the US due to bad weather conditions, it is not hard to remember them (Copeland and Overberg, 2015). The best practice from this case study identifies the mechanism of remembering past events on intentional basis to learn lessons and provide preventive measures as an ongoing process for contingency planning and responding to future multiple collision.

### **2.6.3 Major Emergencies in UK**

The floods emergency in the UK in 2007 was generally considered as disastrous, as it caused many roads, properties and businesses to be flooded and consequently destroyed (Blackburn et al., 2007). The series of floods occurred across Northern Ireland, Yorkshire, the midlands, Gloucestershire etc. (Blackburn et al., 2007), which caused 13 fatalities and damages of about £6 billion (The Pitts Review, 2008). The response mandated cooperation of response agencies from all over UK, the Red Cross assisted councils and blue light services during and in the recovery stage of the flood (The Pitts review, 2008).

Combined response effort was particularly necessary in Gloucestershire area because water was contaminated as a result of the flood, and emergency drinking water needed to be distributed to residents in the county especially many who were unable to leave the vicinity due to the flooded roads (Savill, 2007). Due to lack of preparedness, the prime minister at the time, had to urge for supplies to be increased to meet urgent needs of victims, millions of pounds promised to flood-hit councils and more millions of pounds was to be put into flood protection measures (BBC, 2007).

However, help could have arrived earlier, but the delayed response and lack of preparedness led to one in five homes in Hull to be damaged and 90 of the 105 schools in the city suffered some damage (Laing et al., 2009). While the military was called to help in Gloucestershire response due to water contamination, it was not called to help in Hull (Laing et al., 2009). Although the overwhelming state of the event was evident, the lack of preparation for such magnitude of flood by the government was largely criticised, even though response was well coordinated to minimise death.



**Figure 2.10: Flooding at the confluence of the rivers Severn and Avon (Floodrisk, 2011)**

Figure 2.10 shows the wide spread impact of the flooding and damage to the infrastructure, movement and services. It also shows how modern society can be easily affected by ME without adequate planning and response, emphasising the relevance and importance of contingency planning. Figure 2.11 also shows other areas within the UK that were affected and the extent of the impact experienced in such places.





**Figure 2.11: Tewkesbury under water as result of the water (Floodrisk, 2011)**

The impacts of ME are undeniable from the pictures examined thus far. Thus, to ensure that lessons are learned, an independent review and inquiry was set-up to examine response and management of the flood (Laing et al., 2009). The Sir Michael Pitts Review became one of the significant ways of changing policies and measures for flood management and emergency management in general in the UK. The 400-page report included 92 recommendations for government, emergency agencies, environmental agencies, met office to take on board in view of ensuring better response to future flood emergency.

All recommendations by Pitts review were pre-planned rather than ad-hoc (The Pitts Review, 2008). In addition, monthly summaries of community recovering from flooding events were recommended so others can learn from them (The Pitts Review, 2008). While events of flooding after 2007 summer floods were better managed, 2014 winter floods challenged in system and level of resilience to flooding in the UK. However, lessons learned are ongoing and can be said in the case of UK utilises past ME mechanism as cognitive and political means of enabling process and outcomes for dealing with future

ME. The best practice from this case study identifies ability to utilise past ME as mechanism for learning lessons by having an independent review as cognitive and political way of enabling contingency planning and improved response to future flooding in the UK.

Therefore, the characteristics of events in Japan, USA and UK suggest the need to have special preparedness arrangements in addition to regular preparedness measures for responding to ME should they occur and when they occur. These events occur on scales and magnitudes which are unprecedented or their impacts are unforeseen even when they are regular events due to severe weather conditions. While these characteristics indicate the predictable nature of ME, the difficulties of responding to them is yet to be better prepared for. Furthermore, the rate these events escalate, the impacts on people and environment are all generally acknowledged (Moynihan, 2008). Unfortunately, the planning for them have not measured up to the required response capacities.

The Japan disaster occurred because of large scale natural disaster (earthquake and tsunami) which further triggered nuclear meltdown. ME in the US had been caused by severe weather such as snow or fog which resulted low visibility and then in multiple collision of cars. Consequently, ME in the UK was also caused by unprecedented weather conditions which further led to contamination of the water plant, loss of home, lives and overwhelmed the ability of emergency agencies to function (The Pitts Review, 2008). The measures taken to improve response have been to learn from experiences, approaches and strategies used countries such as US, UK, Australia and Japan, especially the first three with whom the UAE have signed agreement with already.

However, lessons are yet to be directly learned from incidents that occur in the country to directly improve practice, planning measures, process and response to ME. This inference is made because some events as briefly mentioned in this section continue to occur in similar fashion annual and having similar impact on the public. This emphasises the importance of this research and relevance of this research area to improving planning and response to ME in the country.



#### 2.6.4 Major Emergencies in New Zealand (NZ)

Like Japan, New Zealand (NZ) have been experiencing chain of events that forced the country to identify lessons and seek mechanisms for utilising them. On September 4, 2010, one of the cities in NZ, Christchurch experienced 7.1 magnitude earthquake (Fakuade, 2014). Although there was no death recorded, there was damage to over 1,000 buildings and homes, disruption to services and normal activities (Fakuade, 2014). But the earthquake that occurred six months later on February 22, 2011 had more severe impacts than that of September 2010.

The 6.3 magnitude earthquake, although lesser in magnitude, resulted in 186 deaths, damage and destruction to over 500,000 buildings and homes (Fakuade, 2014). The 2011 event caused landslides and rockfalls issues that cost almost \$100 million dollars (McLean et al. 2012). 80% of the city experienced water supply disruption, 100,000 houses left without sewerage, 37,000 houses without power, 180,000 homes required repair, with 24,892 individuals required relocation (Fakuade, 2015; McLean et al. 2012).



Figure 2.12: Impacts of the 2011 Earthquake (Turner, 2011)

These pictures (Fig. 2.12 and Fig. 2.13) show the extended impacts of ME when contingency planning is lacking. In addition to this, these impacts indicate how ME can rapidly escalate to the extent that they cause wide spread destruction and uncontrollable consequences that warrant support from different organisations and government levels. The impact of ME in 2010/2011 further emphasised that contingency planning is important, and in the NZ context where communities are prone to impacts of different naturally occurring hazards, lessons need to be learned, transferrable and utilised.



**Figure 2.13: Cascading effects of 2011 Earthquake (Turner, 2011)**

Figure 2.13 shows the spread of liquefaction in one of the suburbs in Christchurch and how liquefaction made it necessary to demolish over 8,000 buildings that had survived the immediate impacts of the 2010 and 2011 quake sequence (Fakuade, 2014). The characteristics of the ME in NZ indicated that there is strong need for comparable levels of preparation. However, the major difficulty for managing events of this nature and extended impacts is ensuring that government agencies, businesses and communities take into account the inevitable occurrence, consequences and complexity that may result from ME in their planning (McLean et al. 2012). Despite this difficulty, the impact or effects

of ME makes it necessary for NZ to identify lessons, but also to develop mechanisms for learning and using them.

Lessons had to be learned due to the overwhelming impacts of the earthquake and cascading effects. For instance, at operational level, many organisations learned that actions needed to be taken to be more resilient and better prepared for future MEs. Due to the multiple after-shocks that occurred in Christchurch post 2011 quake that hindered the recovery efforts, it is acknowledged by the government and emergency sector that future earthquakes may cause fire in cities like Wellington (which is the capital of NZ), thereby escalating the event (McLean et al., 2012). The foresight to think ahead, and ensure that lessons identified in Christchurch are learned and utilised for planning for future MEs both in the affected cities and other cities in the country that are prone to earthquakes position NZ as a good example of best practice.

In this instance, mechanism for lessons learned is in planning for future MEs in both affected city and other cities in the country, putting possible risk scenarios that may complicate or escalate the situation. Wellington which is mentioned in the report written post-2011 earthquake by McLean et al. (2012) acknowledged that the city is densely populated with wooden houses in the older suburbs and reticulated gas (McLean et al. 2012, p.24). These factors may both escalate the event and make response challenging, if not impossible. Such possibilities and realities across the country informed the investigation into lessons learned from Christchurch ME, and the documentation of lessons learned that included six major recommendations for improving planning arrangements for future MEs.

To ensure these recommendations are implemented, committees are set-up to monitor the implementation process and use of lessons learned for future planning. Another mechanism used in NZ to ensure lessons learned is the review of response manual to reflect lessons learned and ensure that action plans and recommendations from the McLean et al. reports are directly incorporated into response arrangements for future MEs. It can be observed that NZ have similar mechanisms for lessons learned as the UK by conducting independent inquiry into response to past ME, but have done better by incorporating the lessons learned into response framework and manual used by emergency organisations for response.



In addition to this, incident controllers across the country are being trained and mandated to attend a national controllers' course (McLean et al. 2012, p. 202) using lessons learned to respond to future MEs as recommended in the McLean et al. report. Therefore, the mechanisms for lessons learned in NZ seem more comprehensive and robust, combining independent inquiries into lessons learned, documentation of lessons learned, incorporating lessons learned into the response framework and manual and the development of national incident controllers by educating and training them to use lessons learned.

### **2.6.5 Major Emergencies in UAE**

In January 2014, the police command room in Dubai received 2,198 calls between 5am to 2pm on rain-related incidents (KT Team, 2014). Although this incident resulted in the death of one person on Shaikh Mohammed Bin Zayed Road where flood water had accumulated, there were injuries to people and near misses (KT Team, 2014).



**Figure 2.14 flooding and its impact in Dubai (KT Team, 2014)**

Figure 2.14 shows the impact of the flood, water on the road, preventing access and easy movement of the vehicles, people and economic activities. Houses were also flooded due to the high-water level and structural design that did not have drainage system that allowed rain to drain away from the roads and streets.



**Figure 2.15 Accidents, rain, floods and wet weather (The National, 2014)**

Figure 2.15 also shows the impacts of the ME that occurred in 2014. Multiple road collision that further complicated response, strain response arrangements and challenges the capacity of the emergency organisations to deal promptly with the ME. It can be noticed from the pictures that the impacts of ME were escalated as a result of human activities and lack of warning to keep people away from the road. Due to the location of the UAE, cities in the country were not accustomed to flooding in the past, as such infrastructures were not designed to cope with coping, neither were emergency response experienced in dealing with flood incidents or flood-related emergencies. Impacts as shown in Figure 2.15 shows that contingency planning is absent in the current practices, nor does the current practice sufficient for dealing with ME and its impact in Dubai.

Similarly, in March 2014, the Abu Dhabi Police (ADP) operations received 2,156 traffic calls with 1,828 incidents in Abu Dhabi and 328 in Al Ain due to incidents caused by flooding from people living in Al Reef, resulting in traffic on Al Samha Bridge (Bell et al., 2014). These incidents even though they have been considered as routine incidents, but due to lack of adequate planning and response arrangement, they end up becoming major emergencies that claim lives and destroy properties.

The number of calls to the police indicate the severe impacts suffered from this ME in 2014, but also indicate that response to the emergency was not effective to prevent it from escalating or mitigating its impact. Lack of contingency planning is evident in this ME scenario also, which also exposes the lapses in the current practices in emergency response arrangements in the UAE.

In 2008 and 2011 there were multiple car collisions on the motorway which were caused by fog and low visibility. The 2008 incident occurred in March at 6:30am and resulted in 3 deaths, 347 injured people and the incident involved about 300 cars (Alshamsi, 2012; excerpt from AD Police report). While some of the injured people were severely injured, others were lucky to have sustained treatable injuries. The incident was on the Abu Dhabi to Dubai motorway and it became complex because about 35 cars caught fire which made it difficult for response operations. Figure 2.16 shows that escalation of ME may be more severe than envisaged.



**Figure 2.16 Overview of major emergency in UAE (Absal and Scott, 2008)**

Figure 2.16 shows that the pile-up of cars as they collided made it easy for the fire to spread, which further made response operation difficult and more challenging to deal with by the emergency organisations. The incident escalated due to the fire, which further complicated response procedure. Response to the ME involved response agencies like the police (Dubai and Abu Dhabi), Civil Defence, municipality to mention a few. In addition to the fire that erupted, the ME incident was also wide spread extending over several kilometres involving hundreds of cars. This scenario projects the extent of ME and its characteristics as examined in the literature review chapter as events that may escalate rapidly through stages and process.





**Figure 2.17 Impacts of 2008 ME (Absal and Scott, 2008)**

As noticed in the figure 2.17 and explanations provided, the ME exceeded the response capacity of the police, assistance from the military was requested to prevent further loss of lives. Assistance of several organisations were also needed in order to divert traffic, prevent further in-flow of vehicles to the motorway and to clear the highway which is the major connecting road between Dubai and Abu Dhabi. A response arrangement that required different layers of activities, decision making process and coordination of the agencies and resources.

As a result, it is evident that contingency planning was not in place, since the nature of the emergency was unprecedented in 2008 when it first happened in this nature. However, its continued occurrence since 2008, although in lesser magnitude suggest that lessons may have been learned in preventing the incident from escalating like it did in 2008 when it first occurred. Hence, the next section evaluates the response arrangement so that this assumption is verified.



### 2.6.5.1 Evaluation of MEs

The location of this emergency was distributed across Dubai which posed a challenge for emergency response, especially in mobilising sufficient resources to respond to traffic incidents that resulted from the flooding. Due to the nature of the incident and wide spread i.e. scope of the emergency, it was also challenging to provide good warning to prevent people from using the roads which could have mitigated and reduced the impacts of the emergency. The time of the incident being early morning also served as a barrier, because people would have set out on the roads before hearing any warning. Due to all these factors, the incident escalated to a ME which the police had to deal with for several hours.

From the incident account and evaluation, it can be seen that the emergency started as an overwhelming incident, indicating that the ME was an event that had an onset (as explained by Mitroff, 2004) that could have been better managed. The lack of contingency planning thus made the emergency to evolve through stages, thus making it an ME that needed to be managed as a process (as explained by Turner and Pidgeon, 1997). This evaluation shows that ME in the case of flood emergencies in the UAE at this period was both an event that had an onset, that escalated into a ME that underwent a process that took hours and days to manage.

The ME evaluated in this section demonstrate that the explanations of ME and its concepts in section 2.2 is applicable in the UAE situation. Above all, it shows that in the UAE, incidents like ME may be both an event and a process due to lack of contingency planning to prevent the incident from escalating. For example, Figure 2.14 shows that the flood spread to buildings and roads which are some of the potential impacts of flood. However, the recurring episode of flooding incident of this nature since 2008 in Dubai with similar impacts indicate that lessons is not being learned. In the this, it appears that lessons learned in this case is “fantasy document” as explained by Birkland (2009).

While it is possible that there might be mechanism for remembering past incident, it is evident from the extent of impacts that modes of utilising the past (Brändström et al. 2004) is not present in the current practices in the Dubai or the UAE in general. This conclusion is made because Eiser et al. (2012) explained that lessons learned are adopted to identify severity of a problem and to necessitate improvement. An example that supports this assumption is also revealed in Figure 2.16 which shows the impact of flooding in 2008 that resulted in deaths and wide spread impacts. The diagram (fig. 2.18)

shows wide spread impacts, submerged vehicles, and major impacts on roads and infrastructures.



**Figure 2.18 Impact of flooding in 2008 in Dubai (Mail Online, 2008)**

Figure 2.18 shows the wide spread impacts in different locations involving people, cars and infrastructures in 2008. Figure 2.19 further indicate the extent to which ME can escalate and spread to several locations even if it starts from an initial point. The picture also confirms that access will often times be challenging, if not impossible when ME occurs, which makes response arrangements for routine emergencies insufficient and ineffective for response. The reality of the complications and escalations that result from characteristics and challenges of managing ME, further justifies the relevance and importance of this research into contingency planning and recommendations for effective contingency planning and response to future ME.



**Figure 2.19 More impacts of 2008 flooding in Dubai (Mail Online, 2008)**

Figures 2.18 and 2.19 are testament to the impacts of ME without contingency planning. Although evident enough and measures have been taken by the UAE governing authorities, it appears more needs to be done in terms of ensuring effective management of ME. For examples, despite the impacts, records, reports and continued impacts of flooding, and traffic related incidents to flooding, the impacts of major emergencies are still severe in UAE which shows that lessons are not being learned from past events, nor are they well utilised.

This is not only peculiar to flooding, but also to other types of incidents. Since improvement is not evident from both response and impacts, it can only be concluded that lessons are not learned, such emphasising the consequences of not have effective contingency planning whose elements include lessons learned and its mechanisms which was explained by Brändström et al. (2004), who emphasised the relevance and role of mechanisms for learning.

The location of the motorway MEs contributed to its impact. Being on the highway between two busy and most populous cities in the UAE, it was challenging for response

organisations to get to the victims since many cars had piled up from the actual point of contact. The nature and scope of the incident also served as barrier to response since fire was involved and many cars have collided. Being a highway also limited access to the location and options of access. Similar to the flooding incidents that caused traffic accidents, the time which the highway ME occurred also made it more challenging. This is because it was early morning when people who worked in Dubai, but live in Abu Dhabi and vice versa, were all rushing to resume work. Thus, the reasons for the severe impact and complexity of the incidents.

However, some lessons seem to have been learnt from these major emergencies, because when similar incident occurred in 2011, the incident was less complex since the cars did not catch fire. The 2011 incident however resulted in 1 death, 61 injured people and 127 cars, because response was more rapid and the assistance from the military as requested quickly (Alshamsi, 2012). Furthermore, more warning signs were displayed to alert and inform motorist to slow down or reduce their speed during foggy weather and season. This measure was taken by the police to reduce the likelihood of incidents like that of 2008 occurring. However, it can be observed that these measures i.e. alert messages are warning messages and the quick activation of the military support are all activities that are peculiar to the response phase (Table 2.2). None of these activities relate to activities or measures taken during the planning/preparedness phase explained in section 2.2. While the 2011 incident and others similar to it are still occurring annually, the impacts are not as severe as that of 2008.

This demonstrate the evidence of lessons learned, but not evidence of other elements of contingency planning or effective contingency planning. Measures taken does not explain arrangement for identifying potential ME, consequences, likelihood, and scope of contingency planning. Since incidents of this peculiar nature have continued to occur in the UAE, it stresses the importance of contingency planning. To this end, it is needful to examine other indicators that may demonstrate that elements of lessons learned exist in the UAE current practice, or evidence of global best practice examined in this section.

#### **2.6.6 Summary and Indicators of Lessons Learned from Case Studies**

The ME examined in previous sections indicate that they were directly caused by bad weather or weather-related factors. While the influencing factor points to the likely causes

of ME in the UAE, it is acknowledged that ME have continued to cause planning and response concern for emergency services in the UAE especially ADP who take a lead on response arrangement for every emergency in Abu Dhabi and at times in other regions.

The pattern of ME in UAE also suggests the need for better preparedness and planning which can increase awareness on and ability to identify potential ME and process, probability and consequences, scope of contingency planning and institute mechanisms for lessons learned. Although response arrangements appear to have improved especially to motorway accidents, it is evident from both case study evaluation that contingency planning and elements of effective contingency planning is lacking in current practice in the UAE.

Based on general observation of trends of ME in UAE, it seems the incidents tend to escalate quickly in similar manner as those in US and Japan examined in chapter two. Escalation of emergencies to ME may have motivated the government to acquire more equipment, develop national response framework and improve on exercise and training of responders (Bell et al., 2014). However, more focus is yet to be given to using lessons learned from past major emergencies for contingency planning in the most effective manner. This gap emphasises the need for this research, and its application since it contains explanations for and evaluation of lessons learned mechanisms in other countries.

Despite the limitation in the UAE system, the “cause and effect” and ripple effects of extreme events is undeniable and evident from all these case studies. The UAE events were all caused by severe weather resulting in multiple car collision due to low visibility or adverse weather conditions. Thus, ME can be seen to have similarity in terms of scales, unprecedented occurrence and/or mixture of natural and man-made incidents which make them challenging to manage (Perrow, 2011). In addition, it is noticed from the case study evaluation that ME in UAE has the characteristic to occur as both an overwhelming event (Mitroff, 2004), which further escalate through stages (Turner and Pidgeon, 1997).

The case study evaluation has helped to clarify what constitute ME in UAE and their characteristics. It is also evident from the evaluation that contingency planning and all the elements of contingency planning are all lacking in the current practice in the country. However, the purpose of Table 3.1 (below) is to evaluate the global best practice that may be practiced in the UAE current emergency management system, using the indicators

from section 2.6 to evaluate the current practices. Table 2.7 illustrates the contrast between case study of ME in Japan, UK and US discussed in Chapter Two and that of events occurring in the UAE examined in this Chapter. The table below helps to identify area that require improvement and that of limitation in the UAE system.

**Table 2.7: Contrast and Comparison between learning mechanisms and ME in Japan, US, UK and UAE**

<b>Country</b>	<b>Nature of ME</b>	<b>Lessons learned</b>	<b>Learning mechanism(s)</b>
Japan	Complex disaster starting with earthquake, tsunami and then nuclear meltdown	Assessing history of past tsunamis in Japan so that information can be used to improve planning and prediction and response to future earthquake & tsunami risks in the country (Oskin, 2015)	Remembering the past through intentional means and utilizing the past lessons through cognitive and political support as enabling factor for improving future planning and response
US	Multiple highway accidents caused by heavy fog, snow, dust storm, floods, heavy rainfall etc.	Preventive measures are taken by government to put traffic signs, restrict movement during bad weather, road surface marking & signing, and road safety improvement, while individuals are held liable financially for the consequences of accidents, property damage and injuries to passengers, drivers and fatalities (Copeland and Overberg, 2015)	Learning are still ongoing, but mechanism for learning are; utilising past lessons & using intentional and political factors to provide preventive measures for future multiple collision. Individuals are also held responsible for impacts of accidents as enabling factors to prevent future accidents.
UK	Unpredicted, heavy rainfall that caused widespread damage to water, electricity & livelihood	Conducting an independent public review led by Sir Michael Pitts to identify lessons and use lessons to change policies and measures for flood and emergency management in UK. 92 recommendations were made by The Pitts Review (2008) as pre-plan measures rather than ad-hoc.	Lessons are learned by utilizing the past through cognitive and political mechanisms for improving planning for future floods emergencies
NZ	Unprecedented earthquake, several aftershocks and liquefaction	Conducted investigation into lessons learned and documented by McLean et al. (2012). 5 major recommendations were made, response framework and manual were made and reviewed to include lessons learned, education	Lessons learned by remembering and utilising lessons through intentional, cognitive, political and enabling mechanisms.

		and training courses for national incident controllers to ensure that lessons learned are used for dealing with future MEs.	
UAE	Multiple vehicle accidents caused by bad weather such as fog and heavy unprecedented rainfall	UAE government acquired more equipment, and developed national response framework (Bell et al., 2014)	Lessons have been driven by political or governmental factors without any reference to lessons learned from past ME

Table 2.7 compares and contrasts practices from Japan, US, UK and NZ (from chapter two) which show that these three countries have demonstrated ability to learn lessons by directly using information from past incidents that caused severe disruption to ensure better planning and prevention. As noticed in Table 2.7., the focus is not on response arrangement, but from planning arrangement that informs the response procedure to ME.

However, according to literature and documents on the case studies evaluated in this chapter, UAE current practice made no link between using lessons from past ME to influence planning for future emergencies. Therefore, this gap and ones identified directly when evaluating the case studies emphasize the importance and relevance of this research especially in the UAE context and the need for recommendations which can guide the planning and response process for future ME. It also influences the types of questions that needed to be asked during the primary data collection process which are presented and analysed in chapter five. Thus, the next section outlines and examines possible challenges associated with dealing with ME, the barriers they cause for learning lessons and the drivers which can make lessons more “learnable”, so that lessons can be applied for contingency planning in view of managing future ME.

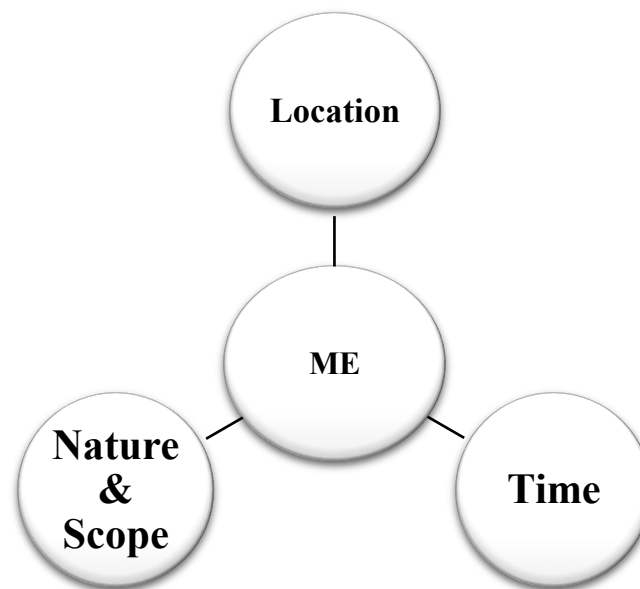
## 2.7 Managing Major Emergencies: Challenges and Barriers

This section explains and critically examines the challenges experienced in managing ME and the potential barriers to effective response. While it is possible that resources may

abound in dealing with MEs (Mitroff et al., 1996), Dillon et al. (2009) argued that situation awareness is crucial in mobilising timely response, communication and mitigating the impacts of any emergency. Thus, the scale and speed in which extreme and complex events unfold are sufficient reasons for inferring that any ME will be challenging to manage due to barriers and other human-related factors that is examined in this section. The first subsection examines the challenges that may be experienced, while section 2.7.2 focuses on barriers.

### **2.7.1 Challenges in Managing Major Emergencies**

The explanations of ME examined in this chapter have indicated that MEs are not easy to manage nor prepare for in a routine manner. Since they have characteristics that make them peculiar and escalate, it is important to examine the challenges that make ME more difficult to deal with as compared to routine or regular emergencies. Mitroff (2004) emphasised that three variables can make responding to extreme events or ME more challenging. These factors or variables (shown in Fig. 2-20), which are location in which ME occur, the time in which they occur and the nature or/and scope of their occurrence have strong ability to limit response arrangements.



**Figure 2.20: Challenges to managing ME/extreme events (Mitroff, 2004)**



As illustrated in Figure 2.20, all three factors have the potential to simultaneously influence and escalate any ME if contingency planning which specify procedures for mitigating the impacts of these factors is not in place and rehearsed. According to Mitroff (2004), location in which ME occur can pose a challenge or drive the response arrangements. It is the peculiar for emergency response to be rapid, however, the case studies reviewed shows that the events in Japan occurred quickly and so did other incidents, while the location they occurred also made it challenging to respond to. Perhaps this is because recent ME occur in unexpected magnitude and complex ways which place a demand on all existing resources at the disposal of those impacted (Mitroff et al., 1996).

Furthermore, time is significant in preventing the stages of ME to escalate and the onset which Turner and Pidgeon (1997) explained. Even when the location in which ME occur is not remote or of close proximity to natural hazards as the Japan incident, the nature and scope of the incident as seen in the UK, U.S and UAE case studies often make response problematic and challenging. The UAE multiple collision saw the cars explore which made it impossible for any responding agencies to approach to save people.

Such conditions, nature and scope of incidents makes it challenging to deal with ME. While these three main challenges directly make dealing with ME challenging, they minimal effects on ability to conduct investigation which can translate into learns learned. Meyers (2011) argued that, the manner in which ME occur at times with limited level of prediction makes learning lessons difficult. This is because responders and emergency response agencies are so overwhelmed with the urgency of preserving lives and properties that it is almost impossible to identify and record major lessons which can be embedded in future plans to improve disaster response (Meyers, 2011).

### **2.7.2 Barriers to Managing Major Emergencies**

The explanations of previous section indicate that challenges are external to the emergency management system, organisations and procedures. Therefore, procedures and planning for response are suitable when they are effective enough to reduce their impact on response arrangements and monitored to prevent them from escalating ME (Mitroff, 2004). Although mechanisms for lessons learned have been identified in literature and case studies of other countries as suitable for mitigating these challenges

(Meyers, 2011). However, Perrow (2011) argued that the frequencies of ME or routine emergencies often hinder the ability to identify lessons, adapt them and transfer the knowledge before another incident occur. Thus, suggesting that the frequencies of ME can be barrier in itself to ability to learn lessons and use the lessons effectively for future planning and response.

Another barrier is explained by Boin et al. (2005) which states that learning from crisis or past disaster often contain a paradox in which “when the need for learning is at its peak, the institutional capacity of public leaders and their organisations may be disappointingly low” (Boin et al., 2005:120). Despite the attempts to apply lessons identified from one crisis or emergency to another, there are often ambiguous cause-and-effects relationships in emergency which allows contradictory, multiple and/or mistaken lessons to emerge from past incidents (Boin et al., 2005). Pidgeon (1997) explained that perception can serve as barriers to learning, thereby making it challenging to respond to future ME of such nature. The high consequence of incidents makes “trial and error” learning prohibitive (Moynihan, 2008).

Therefore, primary barriers to learning lessons directly from ME can be summarised as follows:

- a. Frequencies of ME shorten the cycle of learning lessons (Meyers, 2011)
- b. Institutional capacity and leadership failure can serve as barriers for Learning process (Boin et al., 2005)
- c. Ambiguity of what to learn (Boin et al., 2005)
- d. Multiple lessons or too much lessons to learn (Boin et al., 2005)
- e. Perception towards learning lessons (Pidgeon, 1997; Moynihan, 2008)

The frequencies of ME, institutional capacity, leadership failure, ambiguity of lessons learned, multiple lessons to learn from and perception about learning lessons are all issues that may be managed and which are independent of external factors like challenges discussed in section 2.7.1. Most of these primary barriers relate to organisational perception, management process and leadership issues that may be addressed and fixed with better understanding of ME and development of effective contingency planning. However, it is considered a higher risk to directly assume that the conditions which surrounded the occurrence of an incident in the past will repeat itself in similar manner in the future.

In situations where a specific location is repeatedly subjected to the same annual incidents, the inconsistency of human nature can influence the application of learned lessons. This is because crisis, emergency and disaster management require inter or multi agency collaboration and learning rather than single organisational learning (Coombs, 2007). Thus, the ability to coordinate the same level of learning across all agencies and organisations involved in response can be challenging (Coombs, 2007). This can also make response interventions challenging as well as serves as barrier to learning lessons. While barriers to learning from the past often arise from lack of relevant experience, technologies and heuristics to draw on or learn from (Moynihan, 2008), these are considered as secondary barriers (Coombs, 2007).

Therefore, challenges of managing ME span from ability to identify applicable lessons to learn from and ability to apply these lessons in preparing for future ME (Coombs, 2007). This further relates to what is considered as secondary barriers to learning, lessons comprise of;

- i. Lack of previous experience to learn from (Moynihan, 2008)
- ii. lack of proper documentation (Clarke, 1999; Birkland, 2006)
- iii. change of personnel (Moynihan, 2008)
- iv. limited understanding and application of the context of lessons identified (Rosenthal et al., 2008)

As noticed, these factors or barriers are more operational in nature in that they relate more to human resource and lack of individual or group understanding of ME, and contingency planning in relation to lessons learned. According to Rosenthal et al (2008) barriers can lead to wrong lessons being identified and learned. Mitroff et al. (1996) also emphasised that lessons of past incidents can narrow focus and lead to limited information sharing among concerned emergency response agencies. This also means that old solutions are at times applied to new problems which might make lessons learned ineffective (Lagadec, 1997).

Therefore, the challenges associated with dealing with ME as well as barriers to learning lessons as examined by different authors in this section have emphasised the relevance and importance of this research area. It has also indicated the need to identify drivers which are likely to improve response arrangement as well as learning process based on

the understanding of ME as both an event and a process. Therefore, the next section examines drivers and essential guidelines for contingency planning for dealing with extreme events that can serve as guidelines for the UAE.

## **2.8 Drivers of Effective Contingency Planning**

The challenges of managing ME or events have been acknowledged in section 2.7, while earlier section on contingency planning have identified the elements of effective contingency planning. The drivers for contingency planning therefore include, but not limited to identifying potential MEs and processes, acknowledging the probability and consequences of MEs when not appropriately planned for. Other drivers for effective contingency planning also include lessons learned and ensuring that mechanisms are in place for remembering and using lessons from past MEs. These drivers all need to be used to define the scope of contingency planning in order to determine resources, procedures and necessary policies that need to be put in place to facilitate contingency planning process.

As noticed from the case studies examined, MEs cause varied levels of impacts depending on the nature or scope of event. But the impacts of MEs were undeniable in all the countries examined and the fact that routine emergency planning were insufficient in managing, nor in preventing the escalation of the events. While the elements of effective contingency planning were evident in the case studies, there are other drivers that may enhance the ability of emergency organisations to better prepare for and respond to MEs.

For instance, Perrow (2011) argued in favour of improved communication within and between emergency response organisations and the role of tools in enhancing warning and response arrangements. It is acknowledged that technologies made available in modern times can help to promptly communicate warning and mobilise response, capability and expertise of emergency agencies to ensure response is more effective (Perrow, 2011). However, Lagadec (1993) emphasised that being able to effectively and rapidly coordinate all factors that may be considered as favourable conditions and elements of contingency planning are drivers for ensuring good response to MEs.

### **2.8.1 Deductions and Gaps on MEs and Contingency Planning**

This chapter has thus far revealed that emergency management is most critical in the response phase where different types of incident occur. As seen in the case study evaluation in this chapter, it does not matter the type of incident; whether naturally occurring or man-made, it is the response to them and arrangements in place prior to the onset of the incident that matter. Concepts in chapter two clarified that ME may be an event (Mitroff, 2004) or a process (Turner and Pidgeon, 1997). But within the UAE context, it is both an event and a process since the event tend to escalate into a more complex or extreme scenario that cause severe impacts.

However, it can be noticed that the characteristics of ME are similar in terms of the wide spread impacts, destruction and difficulty in managing them. From the pictures of ME in other countries in chapter two and those of MEs that occurred in UAE examined in this chapter, it can be noticed that MEs occur as examined and discussed in the literature review regardless of the countries and types of their occurrence. The explanations on the characteristics of ME are key in determining the consistency and nature of ME in order to plan for and respond to them more effectively.

Thus, the elements of contingency planning especially determining reliable mechanisms for remembering and utilising lessons learned from past ME are all essential for ensuring better arrangements and planning for future ME. The first gap identified from the literature review and case study evaluation is that, the current practices and arrangement for emergency management and for dealing with ME in the UAE is not sufficient for mitigating the impacts nor for effective response to ME. The pillars of crisis and emergency management shown in Figure 2.5 though appear sufficient, it does not cover elements of contingency planning, nor arrangement for dealing with emergencies which have characteristics to be both overwhelming event and process that escalate quickly.

Second gap identified relates to the third research objective. Best practice may have been adopted from other countries like Japan, UK, US and NZ as mentioned in chapter two, but it became clearer from the evaluation in this chapter that best practice for dealing with ME is not evident in the UAE current practices for managing ME. Mechanisms for learning lessons, and for utilising lessons learned from past ME are absent as seen in the case study of the motorway accident. Even though response arrangements and activation of other agencies are improved on, activities in place to improve and prevent the incident

of fog-related accidents from occurring do not have any elements of effective contingency planning.

Another gap is identified from chapter two, but further exposed in this chapter is the lack of contingency planning. The case study evaluation has shown that contingency planning is lacking and not applied even to ME that tend to be recurring with severe impacts. While the previous chapter did not indicate whether it is embedded in the current arrangements for emergency management in the UAE, the case study has shown that escalation of ME is as a result of lack of contingency planning.

Therefore, these three gaps strongly support the need for recommendations that may aid the improvement of how ME is managed in the UAE. Despite these gaps, it is fair to assume that the nature of events and challenges may have also made current practices less effective. For example, case studies evaluated indicate that location where these events occurred did not favour response arrangements, neither did the time they happened, nature and scope, facilitate effective response procedure. These factors (which were also underlined in the case studies) are all challenges identified in Figure 2.14 as general challenges associated with managing ME.

Challenges such as these make dealing with ME very complex. Despite this, elements of effective contingency planning like mechanisms for lessons learned have strongly indicated that impacts of ME can be mitigated. Hence, the case study evaluation has also revealed that the challenges experienced in the UAE are similar to those identified in chapter two. Furthermore, barriers such as frequency of ME which prevent the ability to learn and utilise lessons (Meyers, 2011) and institutional capacity failure may have served as primary barriers to learning and applying lessons.

Best practice like improving response arrangement, creating awareness of likelihood of accidents and rapid activation of the military to support response have helped to limit the impacts of ME (fog-related accidents) in UAE. The lack of contingency planning is seen to have an overall impact on how any ME is managed as seen in response to flood emergencies. Hence, it is needful for the UAE to incorporate contingency planning generic to the ME in order to prevent, mitigate and respond more effectively to ME when it occurs in any emergency type, size, and in any location or scope.

While these deductions have been made from documents reviewed on the UAE and case study evaluation, it is possible that other factors may be responsible for gaps identified in chapters two and three. Hence, it is crucial to further investigate these deductions and to evaluate the UAE current practices to better understand the context of response to ME. The outcome(s) of evaluating UAE current practices is also important for identifying best practice in the current system that may be used as mechanism for lessons learned, as well as drivers for advancing effective contingency planning for dealing with future MEs.

## **2.9 Guidelines for Effective Contingency Planning**

The challenges of managing ME or events have been acknowledged in section 2.7, while section 2.5 evaluated mechanisms for learning lessons. Lessons and experiences of past ME have also served as constructive means of learning to be better prepared (Jaques, 2010). It can then be inferred that, if actual lessons are identified and applied to the planning for potential future ME, it is possible that the challenges of managing ME can be minimised. This assumption is supported by Lagadec (1997) who argued that past lessons can be applied to build scenarios around likely risks and potential impacts of incidents and using the same lessons to make suitable planning for ME.

However, it is challenging to learn, apply, coordinate lessons and effectively use past lessons for future unknown events, this uncertainty perhaps makes extreme events more difficult to manage. Therefore, the drivers and guidelines for contingency planning for ME is based on combining the elements of effective contingency planning but starting with identifying potential ME and process. The sets of guidelines derived from this literature review is shown in Table 2-8.

**Table 2.8: Guidelines for contingency planning for ME (Adapted from Literature Review)**

	<b>Drivers</b>	<b>Description of guidelines</b>
<b>Effective Contingency planning</b>	<b>Identify Potential MEs and Processes</b>	<b>Take step 1</b> for contingency planning – <b>PREPARATION</b>
	<b>Probability and Impact/Consequences of MEs &amp; processes</b>	<ul style="list-style-type: none"> <li>- Use stages by Turner and Pidgeon and Mitroff analysis to determine ME as a process and event</li> <li>- Identify challenges to managing past ME (location, nature/scope of events, time)</li> </ul>
	<b>Lessons Learned</b>	<b>Take Step 2</b> for contingency planning – <b>ANALYSIS</b>
	<b>Scope of Contingency Planning</b>	<ul style="list-style-type: none"> <li>- Determine which factor affected response the most; Location, Nature and scope of events or Time</li> <li>- Analyse the impact/consequences of past event</li> </ul>
	<b>Good coordination and communication based on elements of effective contingency planning</b>	<b>Take Step 3</b> for contingency Planning – <b>RESPONSE PLANNING</b>
		<ul style="list-style-type: none"> <li>- Identify <u>primary barriers</u> to learning lessons</li> <li>- Identify <u>secondary barriers</u> to learning lessons</li> <li>- Determine the most suitable mechanism for learning lessons – Mechanism 1 or 2</li> </ul>
		<b>Take Step 4</b> for contingency planning – <b>IMPLEMENTATION AND TESTING OF CONTINGENCY PLANNING AND PLANS</b>
		<ul style="list-style-type: none"> <li>- Determine the impact process and outcomes by using <u>cognitive</u>, <u>intentional</u> and <u>political</u> support to develop preventive measures and response arrangement</li> </ul>

Table 2.7 combines all the main issues evaluated, examined and discussed in this chapter as the recommended guidelines from literatures for contingency planning. Step 1 is the part of elements in Figure 2-3 which adopts the first step in Figure 2-4. The table draws from important component of this chapter by combining approaches, concept and measures to address the gaps identified in this research. For instance, scope of contingency planning, good coordination and communication at all levels are guidelines



which combines best practice approaches identified in case studies of ME in Japan, US, UK and NZ.

The description of guidelines has four steps specified. Step 1 is for contingency planning which focuses on preparation that ought to be based on the understanding of stages that ME may undergo and the process that leads to their escalation. Planning at this stage need to also identify challenges already discussed in previous section in order to determine the most suitable approach for managing the challenges as well as the direct impacts of ME when it occurs. Following on this, is step 2 which is analysis of factors that tend to affect response the most. For example, both location, time and scope of events were identified as the major challenges that were peculiar to ME examined in Japan, UK, US and NZ. While the challenges varied in each country and depending on the type of ME, the analysis of challenges encountered during past ME influenced planning arrangements and contingencies for responding to, and mitigating the impacts of future MEs.

Step 3 relates directly to response planning. It is the step that brings together the activities and outcomes of previous steps and ensuring that primary and secondary barriers that may hinder lessons learned and their utilisation. As explained by Brändström et al. (2004), determining the mechanisms for identifying, remembering and utilising lessons are crucial for effective contingency and response planning. A combine approach such as this makes cognitive, intentional and political a more strategic process and scope for effective contingency planning and response to future ME in the UAE. It combines a learning process which intentionally reflects on past ME as a process and events so that lessons identified is supported by the government and enacted into preventive measures and policies for preventing future ME and managing potential ME.

Step 4 focuses on implementation and testing of contingency planning and plans. This step aims to determine the impact process and outcomes that support the development of preventive measures, and response arrangement that are most suited for the nature, scope and type of ME that may occur. The importance of this guidelines and drivers for ensuring effective contingency planning is emphasised in data analysis and discussion chapter where these guidelines are used to further evaluate the UAE emergency planning and response systems. This is also important for evaluating the best practices and lessons learned from the UAE case studies of ME in the next chapter. Through the UAE focused case study evaluation, challenges for dealing with ME in UAE are identified, drivers for

improving the arrangement and barriers that may continue to hinder ability to learn and improve the contingency planning can be identified.

## **2.10 Summary of Chapter Two**

This chapter has examined theoretical explanations of ME and contingency planning. To further examine the context of these terms, this chapter examined the relationship between ME as both an event and a process which makes ability to learn lessons challenging. The explanations of phases and stages of crisis and emergency management as done in this chapter have provided understanding for possibility and importance of learning from past events. Furthermore, a critical analysis of learning from past events using Clarke (1999) and Birkland (2009) “fantasy document” was done which further led to examining mechanisms and barriers to learning and the influencing factors which make learning from past events challenging.

However, the process of examining the challenges associated with managing ME helped to emphasise the need for this research so that the required intervention between the “incubation period”, precipitating event and onset of ME can be determined. The “incubation period” as explained by Turner and Pidgeon (1997) is the accumulation of unnoticed sets of events which are not accepted as usual conditions for hazards/disasters and the ability to establish ways of avoiding or preventing these sets of events. While the critique of the stages explained by Turner and Pidgeon (1997) exposed the limitation of the stages; the inability to provide the link required preventive activities have also shown areas which this research will contribute to knowledge. The importance of filling this gap is further emphasised when examining the approaches to identifying and dealing with ME as a process and as an event.

The evaluation of elements of effective contingency planning helped to determine the suitable guidelines and drivers which can help minimise the challenges of managing ME as well as ensure effective contingency planning and response. On the basis of this, sections in this chapter examined various mechanisms for learning lessons and two main mechanisms were identified as prominent ones for learning lessons from past response to past MEs. While this chapter has helped to clarify the context in which ME is used in this research, it examined case studies of ME in Japan, US, UK and NZ to identify gaps, ability to use mechanisms for learning lessons.

The case study of events that have escalated to ME due to lack of effective contingency planning were evaluated. Evaluation further exposed the gaps in the UAE current practices and arrangements for emergency management, which is also insufficient for managing ME and its impacts. Indicators that supports gaps identified were illustrated in Table 2.6, while deduction from this chapter has emphasised the need for and relevance of contingency planning, since this chapter has confirmed that ME exists in UAE as overwhelming events and as a process that escalates quickly. Hence, the next chapter discusses the research methodology for conducting further investigation into the deductions made in this chapter.

Although the mechanism used by the UAE to learn lessons from past ME is unclear, examining the current practices for emergency management shows the lack of preparedness model or system which focuses on the preparedness phase to ensure that ME are better managed. Therefore, these gaps clearly show the possible reasons for continued occurrence and impacts of ME in the UAE, which further emphasises the justification for this research. This chapter has helped to partly achieve four out of the five research objectives which are to:

- *Define major emergencies and contingency planning from literature and UAE context*
- *Examine current practices and arrangements used by the UAE government authorities for dealing with major emergencies.*
- *Critically evaluate best practices and lessons learned from managing major emergencies in other countries and in the UAE.*
- *Critically assess challenges for dealing with, drivers for improving and barriers that hinder the ability to improve response arrangements for managing major emergencies in the UAE.*

This chapter has examined case studies of ME in the UAE in order to reveal the current practices and arrangement, and its effectiveness in dealing with ME. This is essential for identifying gaps and in evaluating the current practices so that appropriate guidelines which aligns with the UAE practices are developed at the end of this research. Chapter Three therefore discusses and justifies the methods and techniques selected for verifying or refuting the deductions made in this chapter. It also justifies the selection of methods for achieving the research aim and objectives.

## **CHAPTER 3: Research Methodology**

### **3.1 Introduction**

The methods chapter discusses the methods used to collect required data for this research. The chapter is structured into different sections using ‘research onion’ by Saunders et al (2009). The ‘research onion’ is used to explain how the aim and objectives of this research is achieved. The first section explains research methodology and the background to undertaking any research. Sections after this use the layers explained in the ‘research onion’ to discuss various chapters that can be used for any research and to justify the methods selected for undertaking this research. The last section provides a summary of all sections in the chapter, the significance of research methods to entire research investigation process.

### **3.2 Overview of Research Methodology**

Research methodology provides context for the research objectives and the problem which the researcher seeks to solve while explaining the process taken to arrive at the research findings and conclusions (Creswell, 2005). The purpose of the research methods approach is to examine how gaps identified when reviewing existing researches in similar topic can be better understood through follow-up investigation or collection of primary data (Creswell and Miller 2000). It also helps to determine and justify “how” data can be collected to explain the gaps identified during literature review (Gall et al., 2002).

In the conceptual field of crisis and disaster management for example, several challenges have been identified with responding to extreme or complex disasters in the last two decades (Quarantelli, 2004). Problems such as overwhelming impact of events, limited resources and confusion between responders have been identified by researchers such as Eiser et al. (2012), Meyers (2011) and Perrow (2011) to mention a few. Some of these problems and others associated with responding to extreme and complex disasters form the problem statement for this research for which better understanding is sought.

According to Neef and Shaw (2013) effective response is based on the ability of all responding agencies or organisations to plan the most suitable interventions for ME before their occurrence. To understand the explanations for interventions and practices for contingency planning, it is vital to study the relationship between contingency planning and effective response to ME. Views of responders and understanding of emergency management are regularly captured through the use of survey to understand how effective response can be achieved because several researches in this field.

However, this research is different because it uses methods which allow more in-depth probing and explanations for contingency planning for ME. This in-depth method will ensure that this research improves academic understanding of ME by developing theories which explains how they occur and how they can be better managed. Furthermore, contributions to the professional field can be derived from improved academic understanding of ME or extreme events through the critical examination of concepts, strategies and planning arrangements for ME.

It can be inferred that the principal focus of this research is to draw out explanations from existing theories, but improving on these theories so that academic researchers, disaster responders and managers can be better informed about effective planning and guidelines for responding to ME. Since the literature review has provided background for the theoretical and academic explanations in this area, the pattern of data will be explored further so that similar data can be collected from practitioners in this field. In order to generate data which can be subjected to rigorous and in-depth evaluation and analysis, the non-experimental method which relies on the observation, interpretations and interactions with subjects to determine a conclusion (Gliner et al., 2009) is used.

While experimental method can also be used for carrying out a research, it is not suitable for this research area because it encourages the manipulation of certain portion of the experiment (Davies and Dodd, 2002). Although the manipulation in experimental method is done deliberately to identify a cause-and-effect relationship between variables (Creswell, 2009); the characteristics of ME are such that their occurrence cannot be manipulated in a “cause-and-effect” manner. This makes experimental method unsuitable for this research, while non-experimental method is more suitable.

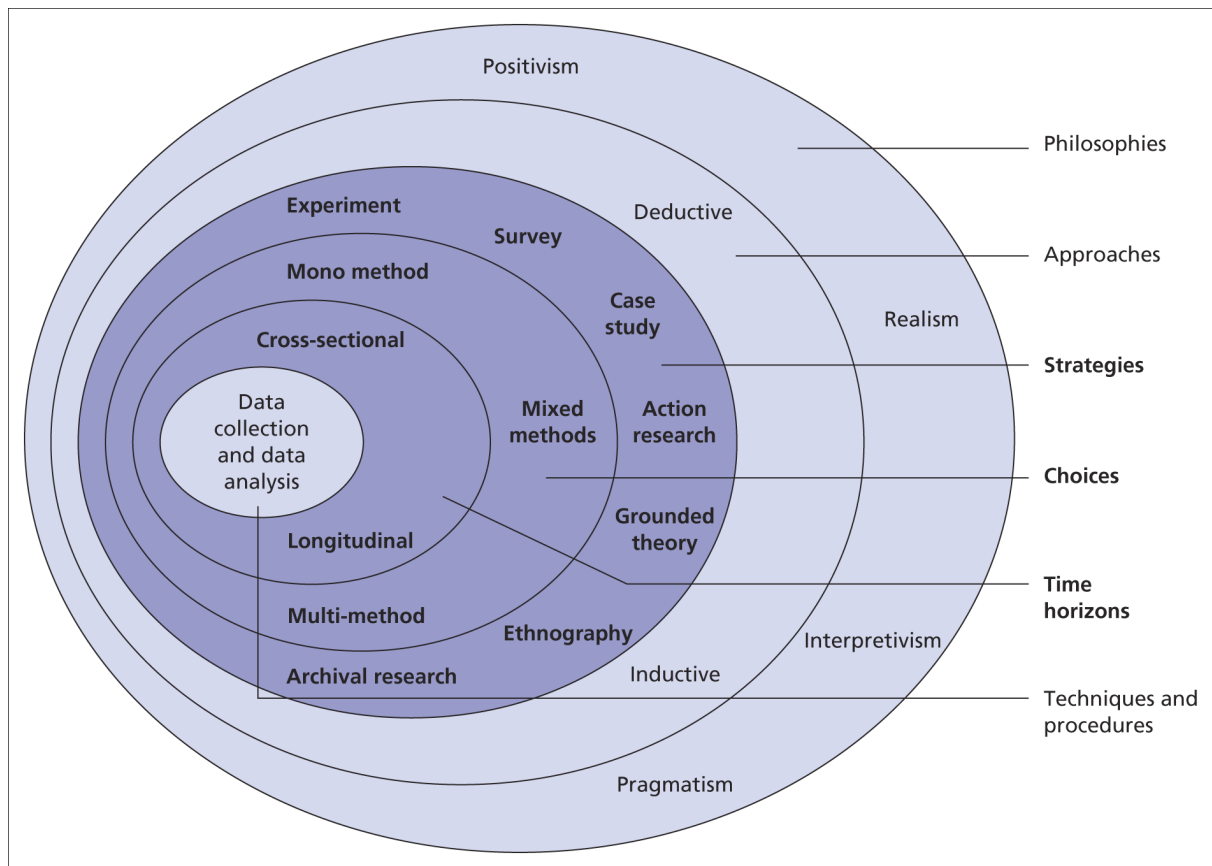
In line with this Morgan (2007) argued that non-experiential method finds its basis in interpretive philosophy which enables a researcher to embark on an in-depth

understanding of the world. Although there is other philosophical thinking which can be applicable to this research, Morgan (2007) explained that interpretive philosophy helps to provide explanations for what people do and their interactions with several activities they involve in to create meaningful experience in the world and cope with problems they encounter.

Beyond the interpretive philosophy, there are other types of philosophies which influence research investigation process. Research methods and process have been examined and discussed by several authors, but this research adopts the ‘research onion’ by Saunders et al. (2009) which shows that research process is like series of layers as an onion which a researcher needs to follow. The reason for choosing ‘research onion’ is that it is a diagram which shows the interactions between different layers a research process needs to undergo (Saunders et al., 2009).

The onion builds the layers on the background that three branches of philosophies such as ontology, epistemology and axiology inform the selection of philosophy that explains a research area (Saunders et al., 2009). Ontology is about what is considered as nature of reality, perception of reality and how reality influences people, their behaviour and the world (Creswell, 2009). Epistemology as explained by Audi (2003) deals with facts, norms and concepts accepted able knowledge within the field of a research. While axiology is the basis for understanding and recognising the role in which value and opinion of the researcher and participants play in data collection and analysis (Gliner et al., 2009).

The background of ontology, axiology, and epistemology of a research then determines the philosophical stances which is layer 1, approaches which is layer 2, strategies (layer 3), choices (layer 4), time horizons (layer 5) and layer 6, which are the techniques and procedures used for conducting a research (Saunders et al., 2009). Figure 4.1 shows the ‘research onion’ and the layers which will be used as guide for explaining the research methods used for carrying out this research.



**Figure 3. 1: The research onion (Saunders et al. 2009)**

Saunders *et al.* (2009) recommended the layers specified in Figure 3.1 as concepts which may help the researcher to determine the most suitable methods for carrying out the research. Therefore, the onion is adopted for evaluating various methods chosen in order to collect reliable and valid data for this research. The next section begins with the ‘research onion’ to explain the research methods used for carrying out this research by starting with the justification for interpretive philosophy as the most suitable philosophical stance for this research on extreme disasters.

### **3.3 Research Philosophy**

The philosophy is the first layer of the ‘research onion’. Philosophies are important in any research. Saunders *et al.* (2009) explained philosophy as the way we think, the understanding of what reality, fact and acceptable knowledge as well as views in a subject

area is. Accordingly, it is the way the world considers the development of knowledge, value, facts and reality which in turn influence what is considered valid, true and reliable in a research (Collis and Hussey, 2009). Research philosophy is influenced by elements such as ontology (the nature and perception of reality), epistemology (addressing facts and acceptable knowledge), and axiology (role of values and opinions). As seen in Figure 3.1, the layer for philosophies contain types of philosophies such as positivism, realism, interpretivism and pragmatism (Saunders et al. 2009). A more recent edition by Saunders et al. (2011) explained that philosophy mentioned in the research onion i.e. positivism, realism, interpretivism, objectivism, constructivism and pragmatism that influence their views of the world (Creswell, 2012). However, Gall et al (2002) and Denzin and Lincoln (2005) argued that there is certain core research philosophy which can be used to explain research process and they are positivism, social constructivist/interpretivism and critical realism philosophy.

Constructivism has the ontological views that what constitute reality in the world can be influenced by people, whereas objectivism believes otherwise (Saunders et al. 2009). Realism is similar to positivism, while pragmatism argues that both objectivism and constructivism are both valid ways of viewing what is considered reality in the world (Kothari, 2008). The explanation suggest that all philosophies explained by Saunders et al. can be classified as positivism or interpretivism in concept. Positivism philosophy generates hypotheses or research questions that can be subjected to test and enables the research to measure explanations against accepted knowledge based quantifiable results that leads to statistical analysis (Saunders et al. 2009). Interpretivism on the other hand refers to the meaning people ascribe to the world, especially issues that concern social life and things that can affect people based on their perception of it (Kumar, 2014).

**Interpretive Philosophy** is the philosophical views which explain the creative nature of people and how they create subjective meanings and concepts of the world to help them relate better with the world (Creswell, 2009). The **Positivist Philosophy** is the approach in which truth of any concept can be verified through facts of reality (Morgan, 2007). Trochim (2000) explained that the positivist philosophy examines the concept of truth through scientific examination processes. While scientific examination processes have been considered as one of the advantages of positivist (Creswell, 2009), it is a limitation for this type of research which requires that the interactions of human activities and their existence which needs in-depth explanations.



**Critical realism Philosophy** holds the thoughts that concepts of the world and the perspective held by people who live in it are part of the world aimed to be better understood (Rescher, 2003). However, Denzin and Lincoln (2005) argued that the understanding of the world is based on the perspective people and those who study it give to it which can be more or less correct until when the perspectives are subjected to critical, different and valid perspectives on reality. Audi (2003) argued that researchers who study the social world are either epistemological constructivists or relativist (or both) who believe that the ontological and ideological worlds and values play a role in constructing knowledge.

Based on the explanation provided, it is justified to adopt the interpretivism philosophy as a more appropriate philosophy for this research area, given that the research objectives aim to understand the dynamics of MEs and how human and the society can better cope with their occurrence. It also seeks to understand the role contingency planning plays in improving the effectiveness of response to MEs. For instance, a critical evaluation of the philosophical assumption shows that positivism possess generalisations that lead to prediction, explanation and understanding of a hypothesis (Collis and Hussey, 2009). However, interpretivism research is context bound using patterns and/or theories which are developed for better understanding of the subject being researched (May, 2011).

It is also noticed in table 3.1 that both philosophies have specific approaches peculiar to them i.e. positivism is deductive in approach, while interpretivism is inductive (Philimore and Goodson, 2004). Based on the understanding of research philosophies, the most suitable for this research is decided based on the requirements for achieving the research aim and objectives. To this end, Table 3.1 have been designed to show similarity, contrasts and limitations of each philosophical stance in order to identify the philosophy more application for carrying out this research.

**Table 3.1: Analysis of Research Philosophies (Devitt 2005; Merricks 2007; Rescher 2003; Audi 2003; Denzin and Lincoln 2005; Morgan 2007; Trochim 2000; Gliner et al 2009)**

	<b>Positivist</b>	<b>Interpretive</b>	<b>Critical Realism</b>
<b>Method</b>	Confirmatory where researcher tests hypotheses and theory with data	Exploratory or bottom-up researcher constructs theory from data collected during field work	Explanatory or bottom-up where the researcher generates data from knowledge and grounded theory
<b>Ontology (Nature of reality/truth)</b>	Objective based on materials, it is structural and agreed upon	Subjective based on mental, personal and constructed values of the world	Commitment to the existence of a real but not “objectively” knowledgeable world
<b>Epistemology (theory of knowledge)</b>	Scientific search for truth and justification by empirical confirmation of hypothesis	Social perception of Individual and group justification based on varying standards	Relativism based on pragmatic justification of specific contexts
<b>Axiology (Value)</b>	Involves a value system that is integral to or based on its research paradigm. Value-free	Research is value laden; the researcher bias can impact on the research	Research is value bound, the researcher is part of what is being researched cannot be separated.
<b>Forms of Data &amp; Analysis</b>	Quantitative based on precise measurement using structured and validated data collection instruments	Qualitative data such as in-depth interviews, observation, open-ended questions to search for patterns and themes	Qualitative data interviews, focus group, the researcher is the primary data collection instrument to determine holistic features
<b>Views and interests</b>	Identifies general scientific laws, regular with cause-and-event views of human existence	Understands social and contextual, personal and unpredictable situations in the society to inform policy	Connect theory and practice to understand specific interests in groups to inform policy
<b>Results</b>	Theoretical terms and/or logic based on, and defined by “fictions” data used to make predictions but without claim to any “reality”	Particularistic findings based on provision of insider viewpoints	Critical realist sees theoretical terms as actual features and properties of the real world (Devitt 2005)

Table 3.1 illustrate the characteristics of three philosophies which may be relevant to this research and the contrast and comparison made in Table 3.1 shows that, the methods, epistemology and views and interests of interpretivism philosophy fits into the research aim which is to provide recommendations for contingency planning to improve future response to ME. The table shows that there is relationship, and need to understand the

influence of method, ontology, epistemology, axiology, forms of data and analysis, views and interests, and results. As seen in the table, method adopted is influenced by ontology, epistemology and axiology which are all branches of a philosophy. Subsequently, forms of data and analysis, views and interests and results are all pre-determined by the axiology, ontology and epistemology that governs the research area. Based on all these understanding and consideration, the suitability of interpretivism philosophy is justified in the next section so that this serves as a guide for collecting objective data through non-experimental approach.

### **3.3.1 Research Philosophy and Justification**

This research finds interpretivism philosophy more relevant to be used as philosophical stance for explaining MEs and to develop recommendations for contingency planning. The justification for this decision or selection is that, the ontological view of this research is subjective, based on personal experiences and academic constructed values in emergency and disaster management. The epistemology is based on the perception of experts, and groups working as emergency and disaster professionals based on variety of standards, theories and concepts in emergency and disaster management. Axiology of the data is based on assumption and value of what is generally accepted in emergency management and with respect to the research aim and objectives.

Interpretivism philosophy provides the process which enables interaction and interpretation of explanations of MEs, learning lessons from past MEs and the relevance of contingency planning for better dealing with future MEs. Thus, the forms of data, mode of analysis and results from interpretivism provide suitable forms which allow the data collected to produce the valid results (Wolcott, 2009). Positivist on the other hand, show elements which favour scientific data collection which will be too abstract for the objectives which needs to be achieved.

Accordingly, people form means of interacting with their environment despite the challenges they experience (Morgan, 2007). It can be inferred that the predictable variable in this research are extreme events which pose a major challenge to manage when disasters occur in such manner. Therefore, it is appropriate to use research methods which

does not allow alterations or manipulation of variables such as MEs, thus emphasising the relevance of interpretivism to this research topic.

Interpretivism are also used because researches, professionals in the field of emergency and disaster management are unable to alter the facts of these incidents, but instead the research is able to rely on interpretations and interactions which results from the experience of managing extreme events. Also, the characteristics of non-experimental research also share similar characteristics with interpretivism philosophical explanations (Gliner et al., 2009). In this sense, this research does not fit into the ontological, epistemological and axiological views of positivism, but more into interpretivism philosophy. This form the justification for selecting interpretivism philosophy and inductive approach which is the methodological approach for interpretivism philosophy research.

Inductive approach refers to a research process which starts with generalisation of concept based on observation which then leads to the creation of theory based on the research findings (Philimore and Goodson, 2004). Inductive starts the journey from taking a clue from the research title and aim and not necessarily from existing theory (Saunders et al. 2009). The explanations of inductive approach then emphasise the significance of ensuring that the research questions are informed by the research aim and objectives (Philimore and Goodson, 2004). According to Saunders et al. (2009) if limited research exists in a topic area, inductive approach becomes more appropriate for conducting the research. All these factors and reasons justify the selection of interpretivism philosophy as more applicable than positivist and critical realism philosophy for this research area and for determining the research approach.

### **3.4 Research Approach**

The second layer in 'research onion' is for approaches. The justification for approaches is that every research requires explanations from theoretical perspective that may lead to rejection or acceptance of hypothesis or observation that motivated the research (May, 2011). This layer shows that a research can be approached from two reasoning patterns; deductive and inductive (Saunders et al. 2009). Deductive and inductive deals with decision relating to research aim, limitations and perspective of research in determining the most suitable for a research (Creswell, 2012). This is because deductive relates to the

logic or progression of a research from a hypothesis, question, or premise which the entire research set out to answer or confirm (Creswell and Miller, 2000).

According to Devitt (2005), it also means the identifying a theory for which an experiment is performed to confirm the theory as true or false or valid or invalid. Explaining deductive from this perspective makes it less of an approach which contributes to knowledge, but one which sets out to confirm existing knowledge (Merricks, 2007). Inductive approach on the other hand is the opposite of deductive approach (Rescher, 2003). Inductive means researching process that leads to creation of theory, and development of concept, principles and/or models for reasoning in a field of study (Saunders et al., 2012).

The explanation of inductive and deductive reasoning shows that inductive reasoning helps to better explain the flow of logic for this research. According to Marshall and Rossman (2006), inductive reasoning is the reasoning from the specific observation to the process of developing generalised and broader theories to explain the initial thoughts. Meanwhile, deductive reasoning centres on having general observation of a research hypothesis and then being able to draw specific results from the hypothesis (Morgan, 2007). This approach is also called “top-down” approach which helps to make specific inferences from a generic observation (Trochim, 2000).

However, the attributes and characteristics of interpretive justify the selection of non-experimental method for this research which can be better investigated through inductive reasoning. In general, and as derived from the explanations thus far, inductive approach is associated with qualitative methods of data collection and data analysis, whereas deductive approach is perceived to be related to quantitative methods. The following outline helps with classifying the two approaches from a broad perspective:

Concepts of deduction associated with quantitative methods have specific type of reasoning that is deductive in nature, objective and causation (Creswell, 2012). In terms of questions, concepts associated with quantitative methods are pre-specified, thereby leading to outcome-oriented (Creswell and Miller, 2000), but that of inductive which is associated with qualitative methods is open-ended which is process-orientated (Saunders et al., 2012).

The analysis type peculiar to quantitative deductive approach is consistent with numerical estimation that leads to statistical inference (Trochim, 2000), but qualitative methods

which is inductive approach is narrative, descriptive and constant (Creswell, 2012). Explanations and critique of different authors have informed the justification for selecting inductive approach which is also consistent with interpretive philosophy.

### **3.4.1 Research Approach and Justification**

This research uses interpretive philosophy which is based on inductive reasoning to derive specific information about contingency planning and ME which can help to develop theories that justify the need for contingency planning. The flexibility and other characteristics of inductive reasoning which allows data to move from general assumptions to the development of theory (Saunders et al., 2009), this justifies the relevance and selection of inductive reasoning for this research. Furthermore, Saunders et al. (2012) inductive reasoning facilitates the process for understanding the meanings people attach to events and common phenomenon in the social world. This makes inductive reasoning which is also synonymous to qualitative data essential to the success of this research.

According to Teddlie and Tashabbori (2009), inductive reasoning and qualitative data creates the opportunity for objective interpretation to be carried out. Whereas, quantitative strategies use experiments that condition people and factors to be quantified and determined within an experimental condition or placebo situation (Creswell, 2009). Non-experimental method based on interpretivism philosophical stance, subjected to inductive reasoning has encouraged the interpretation and interactions of objective data in this research (Audi, 2003). Therefore, to ensure that useful qualitative data are collected, inductive reasoning have been adopted so that the appropriate data collection techniques are selected which will participants to ensure that terms such as “contingency planning” and “ME” are not confused for other terms.

This further justifies the choice of inductive reasoning as the research approach in order to ensure that essential factors for developing effective contingency planning guidelines in the UAE are identified. To further explain the relevance of non-experimental method, interpretivism philosophy, inductive reasoning to this research, the next section examines possible strategies for conducting research and the justification for the strategy chosen for conducting this research.

### 3.5 Research Strategy

The research strategy is the third layer in the ‘research onion’ by Saunders et al. (2009). Strategy in this sense refers to design used for data collection which include experiment, survey, case study, action research, grounded theory, ethnography, archival research to mention a few (Saunders et al., 2009; Sekaran, 2009). The strategy of any research is critical to ensuring that appropriate, valid and objective data are collected that can be analysed to achieve the research aim (Sekaran, 2009). The characteristics and key features between some of these strategies are shown in Table 3.2.

**Table 3.2: Different Research Strategies and Key features**

<b>Research Strategies</b>	<b>Characteristics/Key features</b>
<b>Experiment</b>	Defines theoretical hypothesis, selection of samples from known populations, random allocation of samples, control of all research variables, measurement of research outcomes (Saunders et al., 2009; Trochim, 2000; Punch, 2005)
<b>Survey</b>	Allows the collection of quantitative data, samples need to be representative, gives the researcher independence and limits biases of researcher, structured and objective observation, data are analysed in quantitative way (Marshall and Rossman, 2006; Kumar, 2014; Gilbert, 2008)
<b>Case study</b>	Provides better and quick understanding of a real-life context, enables the use of triangulation of multiple sources of data, can be embedded, holistic, single or multiple case studies (Yin, 2003; Punch, 2005)
<b>Action Research</b>	Research is conducted in action, it involves practitioners in the field being researched to actively participate, the researcher is part of the organisation being researched, promotes change within researched organisation, often combines the research aim and the needs of the research sponsors (Flick, 2011; Creswell, 2012)

<b>Grounded Theory</b>	Theory is developed through induction and deduction, aims to help predict and explain behaviour, develops into theory from data generated by observation, is an interpretive process (Bazeley, 2008; Bordens and Abbott, 2011)
<b>Ethnography</b>	Describes and explains the social world being studied by the researcher, takes place over a long period of time, often naturalistic and involving participants and extended observation (Creswell, 2012; Denzin and Lincoln, 2005)
<b>Archival/documentation research</b>	The principle sources of data are administrative records and documents, research's questions focus on the past, and is constrained by nature of the records and documents (Flick, 2011; Gilbert, 2008)

Table 3.2 shows that each research strategy has its peculiar features which makes them suitable for certain research. Key features of these approaches show that they can be used for various types of research and study. Yin (2009) states that the questions that can be asked through each strategy and the theme they focus on, help to decide which is more appropriate for a research area. For example, experiment strategy only has form of research questions such as “how” and “why” questions? Archival on the other hand ask more wide range of questions such as “who”, “what”, “where”, “how many”, “how much”.

Thus, it is evident that many of these strategies have advantages and limitations and none is perfect (Flick, 2008). This informed the decision to use multiple strategies for this research, in order to triangulate their outcomes to increase the level of validity and reliability of this research (Healy and Perry, 2000). Therefore, case study adopted for this research, as well as survey and documentation. The next section justifies the selection of multiple strategies for conducting this research.

### 3.5.1 Research Strategy and Justification

As earlier mentioned in this chapter, the non-experimental method has been adopted to help explain ME and concept of contingency planning. The aim and objectives of this research makes an in-depth understanding of these phenomenon vital to being able to



develop effective contingency planning guidelines for dealing with future ME. However, documented records which might be outdated for current issues, makes this strategy unsuitable for this research area (Gilbert, 2008). The research questions that documentation or archival research are positioned to answer relates more to the past and understanding of past events, and not concepts relevant for future application (Flick, 2011). Other strategies like ethnography which is known to be time consuming due to the need to actually observe and monitor activities that relate to the research area is also limited (Creswell, 2012) and unsuitable for this study area. Although beneficial in researches that relates to better understanding of cultural beliefs and events, ethnography as a strategy is not helpful for this research context since MEs may not happen the same way or as planned. Grounded theory on the other hand involves the process in which an observation develops into a theory (Bordens and Abbott, 2011).

While this strategy appears relevant to this research area, it is uncertain that theory will develop as predicted, therefore the risking the possibility of not achieving a research aim. The avoidance of this limitation motivated the researcher to consider strategies such as case study, survey and experiment. Of these three, experiment tend to be too rigid and may constrain the ability to arrive at a reliable result which is consistent with interpretive philosophy. Therefore, case study and documentations have been selected as suitable strategies for identifying, studying and understanding experiences from past MEs. The justification for this is that, it is important to identify and understand MEs, best practice, challenges associated with dealing with ME and possible drivers and guidelines for dealing with future one.

Furthermore, the experiences identified and reviewed through case studies from across the world and from the UAE have also indicated the need to demand more accountability from disaster and emergency managers leading to the occurrence of any extreme and complex event (Smith, 2005). While case studies and documentations have been useful in identifying challenges, best practice, mechanisms for learning lessons, examining current practices in the UAE, etc. they are all secondary data which are still limited in their ability to ensure that valid theory is developed through inductive reasoning. Therefore, the survey strategy was used to collect primary data in the UAE to complement and increase validity and reliability of data collected to achieve all research objectives especially two and four. Survey according to Saunders et al., (2012) can be interview

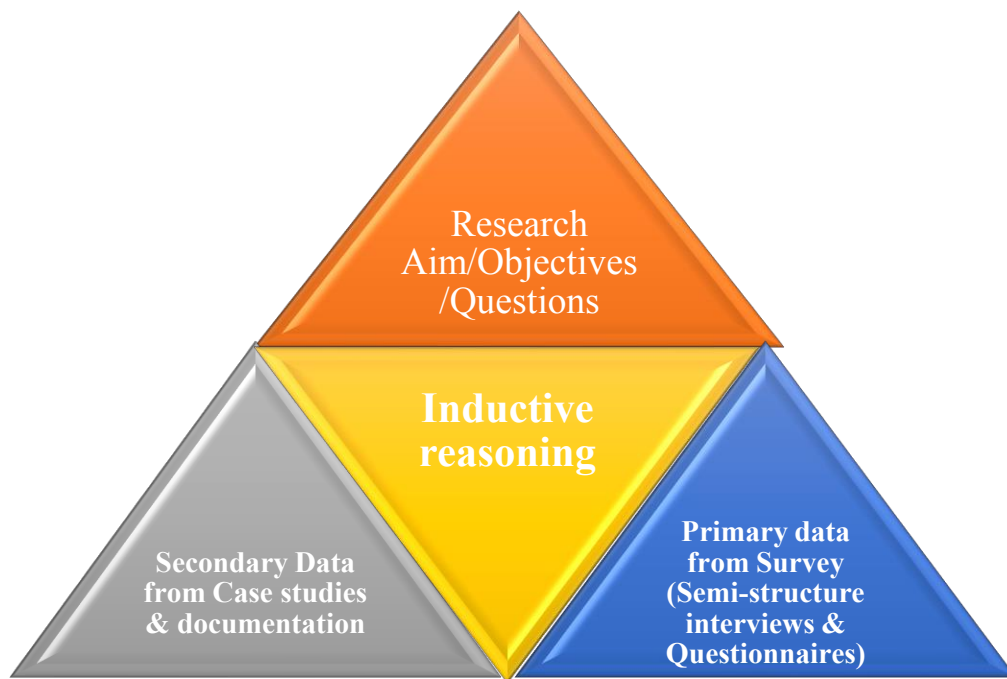
through face-to-face, email, phone etc. or administering questionnaires through similar mediums.

To justify the selection of multiple strategies, Marshall and Rossman (2006) explained that qualitative data through inductive logic uses narrative description, analytical explanations and illustrative scenarios which often make the researcher to present subjective description of the research area. While this is considered as one of the limitations of qualitative strategy and inductive reasoning (Patton, 2002), using multiple methods help to limit subjective interference with the research outcomes (Gilbert, 2008). Therefore, the interaction and breakdown of what strategy was used to achieve which objective is shown in Table 3.3.

**Table 3.3: Relationship between research strategy and types of data**

<b>Sources of Data</b>	<b>Strategy</b>
<b>Secondary Data</b>	<ol style="list-style-type: none"> <li>1. Documentation through textbooks, journals, articles and online information about emergency and disaster management</li> <li>2. Documentation through case study reports on extreme disasters (Japan, UK, US and UAE)</li> <li>3. Review of reports and national framework for managing disasters in the UAE</li> </ol>
<b>Primary Data</b>	<ol style="list-style-type: none"> <li>1) Questionnaire administered in UAE</li> <li>2) Semi-structured face-to-face interview in UAE</li> </ol>

Table 3.3 shows the relationship between methods and data collection strategies. It also shows the specific techniques, and types of data generated from each strategy. The manner in which the research objectives and aim interacts with different sources of data and strategies to generate results is significant for the triangulation process. The illustration in Figure 3.2 shows the interaction between methods, design and strategies adopted as a guide for this research and the triangulation of data from generated by the strategies.

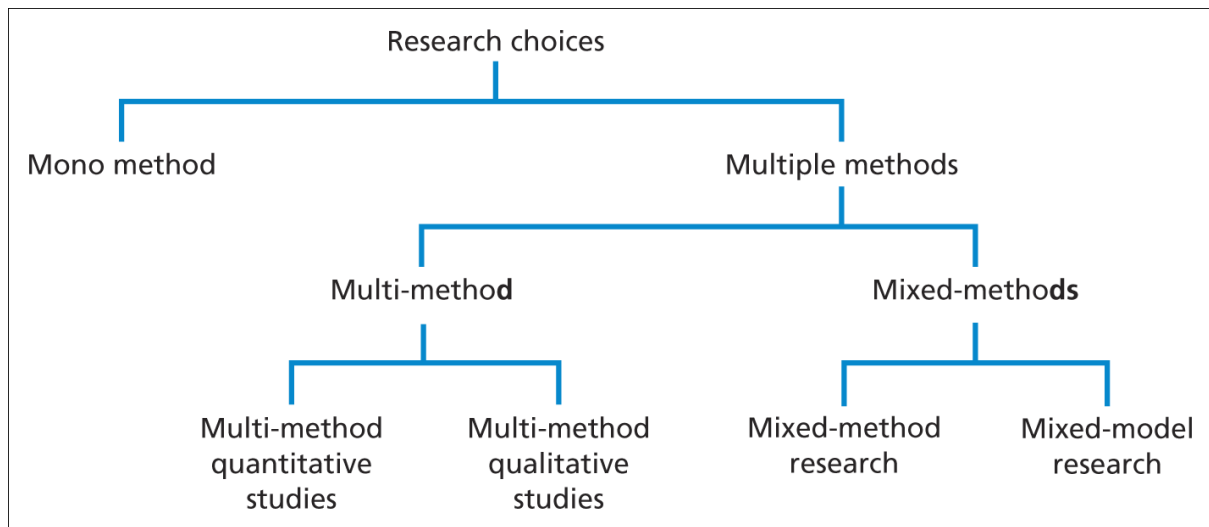


**Figure 3.2 Research logic process and data triangulation (AlShamsi, 2015)**

As illustrated in Figure 3.2, the inductive reasoning process is central to the data collection and strategy process which is based on the research aim, objectives and questions which needs to be answered. Factors such as research choices and time horizons used for this research which made it possible to triangulate and combine strategies are examines and justified in the next section.

### **3.6 Research Choices**

Research choices refer to the style that is used to collect and analyse data in a research (Saunders et al., 2009). Choices in research are necessary and are justified in a research to ensure that consistency is maintained so that data collected remained valid throughout the research process (May, 2011). Though different factors may distort facts and information, choices help to correspond information with research outcomes (Saunders et al. 2009). Each choice has its limitations and benefits and should be considered on the basis of their characteristics and relevance to research philosophical stance (Devitt, 2005). Choice is the fourth layer in the ‘research onion’. As shown in Figure 3.3, the research choices followed the path of multiple methods which led further down into mixed-methods and then into mixed-method research.



**Figure 3.3 Research Choices (Saunders et al., 2009)**

While mixed method which is the strategy which uses mixed and multiple strategies (Teddle and Tashabbori, 2009) have been used for this research. The mixed methods involved that variables such as lessons learned, best practice, challenges and barriers are identified, verified and evaluated in relation to their ability to fulfil the research objectives. It also meant that within the mixed method choice, ME were evaluated as both an event and a process through which lessons and best practice can be learned.

This meant that while this research does not aim to measure the “numbers” of extreme events or their impacts, using mixed methods ensured that through inductive process quality of responses which can provide explanations for improving response to extreme events were identified. By finding the relationship between contingency planning and effective response, and being able to evaluate the implication for managing ME justified the rationale for selecting this choice.

### **3.6.1 Justification of Research Choices**

The mixed-method is therefore adopted for this research on this basis as well as its ability to provide an enabling research environment to draw inferences, interpret meanings, expressions and experiences rather than “tallying up” the number of responses or ME (Levy and Lemeshow, 2008). The justification for using mixed-methods in this research

is to facilitate triangulation as explained by Saunders et al. (2012). Triangulation helps to ensure that data are complementary and generally aid interpretation of results (Teddlie and Tashabbori, 2009). By studying the different aspects and research objectives through mixed-methods through cross-sectional time horizon, the puzzle about ME was solvable (Bryman, 2006).

Despite the limitation of combining several strategies and methods in a research, it is justified to use mixed-methods which comprises of case study, documentation, survey strategies because they facilitate the dynamic interaction of groups involved in a research (Marshall and Rossman, 2006). This particular feature makes mixed-method more preferred for this type of research that aims to develop guidelines and recommendations for UAE governing authorities to manage ME effectively through CP.

Teddlie and Tashabbori (2009) explained that mixed-method adopts strengths and benefits of each strategy to make the research outcome stronger and more valid. Furthermore, interpretivism philosophy ensures that through inductive reasoning and process, all strategies complement each other such that confusion is minimised or eliminated through non-scientific procedure (Flick, 2008). This explanation leads to the importance of the data collection process, protocol and techniques used for carrying out this research, which is discussed in details in the next section.

### **3.7 Research Time Horizons**

The time horizons form the fifth layer in the ‘research onion’. Time horizon can be either cross-sectional study (in the short-term) or longitudinal (in the long-time period (Saunders et al., 2009). Time horizon is selected and justified in this research because, the timeframe in which a research needs to be completed is important and key to successful completion of any inquiry process (Bryman, 2006). With this explanation and justification in mind, the cross-sectional time horizon was selected for this research process due to its characteristics being a timeframe that enables research tasks and activities to be combined within a limited time (Saunders et al. 2012). The rationale for selecting cross-sectional time horizon is that it is more suitable for the nature or types of research activities required for achieving the research objectives and for answering the research questions.

### **3.7.1 Justification for Time Horizon**

The cross-sectional time horizon made it possible to simultaneously identify, examine and evaluate themes and lessons within a short-term, rather than having to study several MEs over a long period of time by waiting for MEs to occur. The primary data collection process required adherence to a time frame to collect data from participants, while secondary data from reports had to be collected within specific time frame, because the information about MEs in the UAE was not available in public domain. This justifies the selection of cross-sectional time horizon for this research. Furthermore, the cross-sectional time horizon made the strategies adopted for this research realistic to achieve and enable the researcher to complete and monitor the research activities and milestones. Cross-sectional time horizon also made the research stages achievable within the available timeframe for completing this research.

### **3.8 Data Techniques and Procedures**

Data collection is the last and inner layer of the ‘research onion’. This inner layer is shared with data analysis which is discussed in the next section. Data collection involves the decisions about sample groups for interview, research respondents, questionnaire content and interview protocol (White, 2009). Decisions about what to use have been arrived at, at this stage based on philosophical stance, approaches, strategies, choices and time-horizons (Saunders et al., 2012).

As mentioned earlier in this chapter, certain data collection techniques are peculiar to some strategies. For instance, qualitative data collection methods enable the collection of rich information with deeper insight into the area being studied, while quantitative data ensures that reliable data is collected (Stenbacka, 2001). Data collection approaches using qualitative methods involves direct interaction with participants on a one to one basis and direct interaction with groups and individuals in group settings (Levy and Lemeshow, 2008).

According to Gliner et al. (2009) the main methods of data collection in qualitative research are; focus group discussion, interviews (structured, semi-structure and informal), action research and observations. Quantitative data collection methods include experiments, clinical trials, survey etc. (Schostak, 2006). While these methods of data

collection are good, the semi-structured interview data collection method was adopted for this research. This is because the research objective is not to conduct an action research which will require an actual project monitoring, evaluation and actual intervention in a situation during this research (Patton, 2002).

The focus groups and observations will be limiting since it is challenging to gather the entire disaster response teams in Abu Dhabi together for observation and focus group session. This is also impossible to do when there is no simulation exercise scheduled or ME to respond to which will provide good opportunity for observation to be carried out. The challenges associated with focus group session and observation makes semi-structured interview and survey the most feasible and applicable data collection method to use for this research (Gilbert, 2008).

However, one of the limitations of semi-structured interview, is that it can be time consuming which means that data is collected from smaller sample of participants (White, 2009). While the semi-structured interview was the last to be completed in this data collection process, the data collection technique attracted the participation of senior officers in the target organisations to participate in the research which would have otherwise impossible.

### **3.8.1 Interview Data Collection and Sampling method**

Participants from organisations who have been involved in responding to ME in the past were chosen as the sample participants for the research interviews. This approach follows the argument by Schostak (2006) which states that interviews are principal ways for allowing participants to describe or explain events or phenomena being researched. Thus, this justified the selection of semi-structured interview and the format for questions asked and in what language the questions are presented (sample of interview questions in appendix C).

According to Levy and Lemeshow (2008) it is the participant who selects the language they prefer to explain the content, experience or information relating to the questions being asked. While this approach is likely to have implications for the ways in which the responses are coded and analysed, they encouraged the collection of detailed information for the benefit of the research analysis (Creswell, 2009). Therefore, in an attempt to limit

the collection of excess or irrelevant data, the semi-structured interview (Schostak, 2006) is used for data collection. This interview type allows series of open ended questions to be asked based on the research topic (Schostak, 2006).

It also allows the researcher to ask questions using prompts to help the interviewee and provides opportunities for both the researcher and in the participants to discuss themes of the research in more details (Creswell, 2009). For example, the word “contingency” could have been misinterpreted and understood by the participants in different ways, however, the confused expression exhibited by some participants allowed the researcher to provide more detailed explanations of the term and the context of use in this research.

A non-probability sampling method; being a technique in which limited numbers of individuals in the population are selected is adopted as this research sampling method (Wolcott, 2009). Based on the research methods and epistemology, it is justified to use judgemental non-probability sampling method to select participants who are working in departments that deal with planning and operational response to emergencies in the UAE. This is because judgmental sampling is a sampling in which subjects are selected in relation to a specific purpose or based on their expertise in the field being researched (Punch, 2005). The sampling method influenced the data collection process and quality of data collected from the participants, hence the justification for selecting the research methods.

According to Wolcott (2009), this sampling method is used when the researcher believes that some individuals or groups are more fit or informed than others in the subject being researched. Another justification for the judgmental sampling is ensure professionals in the emergency management sectors who had been involved in dealing with past ME are recruited for the research. The data provided by these set of people will increase the validity of data collected as well as complement data collected through other strategies.

With this understanding, the judgmental sampling was used to recruit participants for the research based on the relevance of roles and experience in the research area and work in emergency agencies responsible for dealing with ME and other emergencies. Participants were recruited through by sending the information about this research and introductory email and phone calls from the education department where the researcher works. Through this means, Abu Dhabi Police (ADP) and National Emergency Crisis and Disaster Management Authority (NCEMA) and Civil Defence staffs in Abu Dhabi were



recruited. A total of 17 participants were recruited from these three organisations who lead disaster planning and response in the UAE. An overview of research participants recruited through judgmental sample process is shown in table 3.4.

**Table 3.4: Overview of Semi-structured interview participants and criteria for selection (Alshamsi 2015)**

	<b>Participants</b>	<b>Criteria for selection</b>
<b>A</b>	<u>5 officers in ADP</u>	<ul style="list-style-type: none"> <li>- 2 officers from Operations department</li> <li>- 2 officers from Crisis and disaster management department</li> <li>- Foreign expert working in operations department</li> </ul>
<b>B</b>	<u>6 officers in Civil Defence</u>	<ul style="list-style-type: none"> <li>- 2 officers from public safety and emergency department</li> <li>- 1 officer from public safety and emergency department (paramedic)</li> <li>- 1 officer from Civil Defence operations department</li> <li>- 1 officer from Civil defence (Operations for satellite cities/towns)</li> <li>- 1 Senior officer from Dubai Civil Defence</li> </ul>
<b>C</b>	<u>6 officers in NCEMA</u>	<ul style="list-style-type: none"> <li>- 2 officers from operation department</li> <li>- 2 officers from planning department</li> <li>- 2 officers from prevention and safety department</li> </ul>

Table 3.4 shows the list and profile of participants who were interviewed for this research. The interview is carried out using the same structure and questions for all participants. The interview questions are also framed using non-technical language to avoid confusion and to help determine pattern of responses provided by all participants from the three organisations. However, some questions were in a manner that will enable the participants to further explain how major emergencies are being managed in order to help the research investigation process (White, 2009). This is because the semi-structured interview type

allows the participant to elaborate more on a question; a response which can prove useful for the data analysis and research results (Saunders et al., 2012).

This understanding made the researcher ask questions which were specific to the nature of activities conducted by the departments interviewed (*See appendix C for sample of interview questions*). Therefore, to ensure that the participants are free to express themselves, the interviews were conducted in the offices of participants once each participant confirmed their willingness, to participate in the research and a convenient time for the interview. The non-probability sampling has been chosen in relation to benefits of strategies such as semi-structured interview and questionnaire administration.

### 3.8.2 Questionnaire Data Collection and Sampling Method

The sampling method for recruiting participants for the questionnaire was Simple Random Sampling (SRS). SRS is a random sampling method in which variables have equal and unsystematic possibility of being selected for a research (Gilner et al., 2009). The justification for selecting this sampling method is influenced by the population of a place and that equal numbers of participants can be selected demographically from a place (Flick, 2011). Following this guidance, the number of staffs in the departments in Civil Defence, ADP and NCEMA are already known to the researcher.

Therefore, on the basis of this, the target number of participants to be recruited from each organisation was twenty (20 people), making a total of sixty (60) participants, but more than sixty questionnaires were distributed. Table 3.5 shows the sample participants and description from each organisation.

**Table 3.5: Overview of questionnaires participants and criterial for selection**

	<b>Participants</b>	<b>Criteria for selection</b>
<b>A</b>	<u>20 questionnaires from ADP</u>	10 from planning department 10 from operations department
<b>B</b>	<u>20 questionnaires from NCEMA</u>	10 from planning department 10 from operations department
<b>C</b>	<u>20 questionnaires from Civil Defence</u>	10 from planning department 10 from operations department

As seen in Table 3.5, a total of 60 questionnaires were completed by officers in these 3 organisations that are legally responsible for planning and responding to emergencies in the UAE. The aim of the questionnaire is to confirm the current practice for emergency management in the UAE as well as, information about dealing with past ME, lessons learned (if any), challenges, barriers and drivers peculiar to dealing with ME in the country.

The questionnaire design was structured in a way that it encouraged participation. It was designed following the guidance provided by Saunders et al. (2009) who states that questionnaires should be clear and simple to encourage a high response rate. Based on this, the questionnaire had eight (8) questionnaires with both open-ended and closed questions to allow the participants include additional information where necessary to benefit this research (Creswell, 2009).

The questionnaire is designed in such a manner so that participants are able to provide answers within the scope of this research as well as provide more in-depth explanations were required. An explanation of ME and contingency planning were also included in question two to ensure that is no confusion and to provide a common understanding of the research terms as recommended by Creswell (2012). All the features ensured that the questionnaire was relevant to the research area, clear, concise and focused on the research aim and objectives (Bazeley, 2008).

Furthermore, some questions were asked based on the gaps identified in the literature review (*A sample of the research questionnaire can be found in appendix C*). For example, questions number 3, 5, 6 and 7 have been asked based on the findings from the literature review. The participants were recruited through invitation by the managers of each department in each organisation after the managers had participated in the semi-structured interview. Therefore, the managers and all participants of the interviews did not take part in the questionnaire, as questionnaire participants were staffs who were directly involved in carrying out duties, developing plans and in the field responding to events.

### **3.9 Research Data Analysis**

Data analysis is also part of inner layer of the ‘research onion’. Data analysis entails the manner in which data which have been collected are treated, analysed using applicable tools and interpreted to determine the research results (Brace 2008). According to Creswell (2005) the manner in which data are collected is important. Data analysis techniques can make the entire result findings useless, erroneous or biased (Davies and Dodd, 2002), so caution was taken right from the onset of this research to identify and select techniques that can increase the data validity and reliability. As Yin (2009) explained, data analysis is the investigation, categorisation, organisation and testing of data collected on the basis of a research with the intentions of drawing conclusions.

All these understanding and explanations of data analysis led the researcher to select two main data analysis techniques for this research which used mixed methods and strategies for data collection. The secondary data from existing literatures, case studies and documentation are textual and qualitative in nature. While the importance of drawing lessons from past ME have been established in the literature review, ability to capture the explanations from the research participants is equally important, which was made possible through the interview and questionnaire survey.

These sets of data were analysed using Nvivo software which is one of the common ways of analysing qualitative and textual data, while the questionnaire which had a combination of likert scale questions and open-ended questions were analysed using factor analysis. Both the secondary data and the primary data collected were subjected to interpretative philosophy and analysis, thereby providing theoretical context for the data to be explained and analysed. According to Patton (2002) a rigorous process as this, ensures that quality of the subject being researched is guaranteed, while interpreting and understanding context of subject being researched is reassured. This data analysis technique justifies the selection of Nvivo and factor analysis techniques for ensuring that the research aim and objectives are achieved, while the research questions are also directly answered.

#### **3.9.1 Interview Data Analysis**

Content analysis is a data analysis tool used to identify and determine the presence of certain words or themes within texts (Krippendorff and Bock, 2008). Content analysis is an analytical technique which permits the classification of themes, inferences and coding

of phrases relevant to the research area (Saunders et al., 2012). These characteristics justifies the selection of content analysis since this study contains few words that need to be assessed and qualified, thus the importance of using a method that permits classification of words. The words or themes can be quantified and analysed based on value statements derived from subjective experiences or information (Krippendorff and Bock, 2008). All themes gathered from this process were analysed in an inductive manner to form basis for theory, which will help to develop guidelines and recommendations for improving how extreme events are managed in the UAE.

The interview data was further analysed using NVivo software program version 11.04 for Windows. This software is one of the most common programs used for analysing qualitative data. The justification for using Nvivo software is based on its advantages which include the import of information, and process that permits coding of written data, and ability to edit the text without affecting the coding (Rowe, 2007). Nvivo also enables searching for combinations of words in the text; permitting data to be separated into sub classes, which provide a simpler structure for realizing emergent themes review and more secure in the case of data backup (Rowe, 2007). The use of this software facilitated the text analysis process, allowing valid and reliable induction and inferences to be made from the data gathered.

Furthermore, to ensure no useful information is not lost during the interview process, all interviews are audio-recorded. The method of documenting interview discussion also provides the researcher with the opportunity to later edit out the information which is not useful to the research process (Schostak, 2006). Saunders et al. (2012) explained that this process of transcribing data and information can be demanding and long, it is important that the appropriate information is collected for a research of this nature.

Furthermore, Data which have been collected and transcribed are analysed using content analysis (White, 2009); the process followed four stages:

- **Stage 1:** Categorization and coding of data to ensure that similar information that pertains to each objective and research questions are grouped together under the theme that they belong to.
- **Stage 2:** interpretation of theme was carried out to ensure that all responses, data under each theme were carefully examined and triangulated to identify similar

themes. At this stage, all data become one and not individual data from secondary or primary data.

- **Stage 3:** analysis of interpreted themes
- **Stage 4:** Generalisation of themes analysed in order to draw conclusions for the research and to identify new themes which had emerged from the research process and can potentially contribute to knowledge.

The guidance provided by Krippendorff and Bock (2008) were used to carry out these stages which are particularly useful when analysing a lot of text data. These four stages were also helpful in determining response pattern and themes as well as the relevance of results to research objectives (Punch, 2005). In addition to this, the Nvivo software was used to classify the themes and illustrate them through mind map and nodes which are features available in Nvivo for explaining text data. Themes and sub-themes analysed are illustrated in Table 3.6.

**Table 3.6: Research Themes and Sub-themes**

<b>Themes</b>	<b>Sub-themes</b>	<b>Source</b>
<b>ME</b>	<ul style="list-style-type: none"> <li>• Event</li> <li>• Process</li> </ul>	Figure 2.2 sourced from Turner & Pidgeon (1997) and Mitroff (2004)
<b>Lessons learned</b>	<ul style="list-style-type: none"> <li>• Mechanisms for lessons learned</li> </ul>	Table 2.5 sources from Brändström et al. (2004)
<b>Contingency planning</b>	<ul style="list-style-type: none"> <li>• Steps for contingency planning (Preparation analysis, response planning)</li> </ul>	Figure 2.4 sourced from UNHCR (2011)
<b>Effective Contingency Planning</b>	<ul style="list-style-type: none"> <li>• Identify potential ME</li> <li>• Probability of ME</li> <li>• Consequences/impact of ME</li> <li>• Lessons learned</li> <li>• Scope of contingency planning</li> </ul>	Figure 2.3 sourced from Meyers (2011); Mitroff et al. (1996); Andrew and Carr (2013); Coombs (2007)
<b>Challenges</b>	<ul style="list-style-type: none"> <li>• Location</li> <li>• Nature &amp; scope</li> <li>• Time</li> </ul>	Figure 2.6 sourced from Mitroff (2004)
<b>Barriers</b>	<ul style="list-style-type: none"> <li>• Primary barriers – relating to lessons learned</li> </ul>	Section 2.7 sourced from Meyers (2011), Boin et al. (2005), Pidgeon (1997),

	<ul style="list-style-type: none"> <li>• Secondary barriers – relating to lack of experience, knowledge, documentation and change of personnel</li> </ul>	Moynihan (2008), Clarke (1999; 2006), Rosenthal et al. (2008)
<b>Drivers</b>	<ul style="list-style-type: none"> <li>• Combines all segments in this table</li> </ul>	Table 2.7

Table 3.6 shows the themes and sub-themes sought through the primary data analysis. While the words and phrases listed in the table are the themes relating to the research objectives, the researcher aims to identify any or most of the words/phrases from the information provided by the respondents from the primary data. The themes are also used to inform the decision to determine the objectives that have been achieved and the explanations for gaps identified in chapter two. Identifying these themes and subthemes aids the discussion of results and to identify the elements of each of the theme in the current practices in the UAE.

### 3.9.2 Questionnaire Data Analysis

Data collected through questionnaire were analysed using factor analysis. Factor analysis is a data reduction technique used to condense large data sets into smaller ones by subsuming certain characteristics under a larger umbrella heading (Tabachnick and Fidell, 2007). The justification for selecting factor analysis is because of its statistical approach that helps to perform actions with the minimum loss of information. Given that a lot of data was collected during this research, the researcher is keen to draw relevant and useful information from all information provided by the participants. Factor analysis is also justified for this study, because it can be used, and so used in this study as a means of reducing the large amount of highly correlated variables into a smaller number of latent uncorrelated variables (factors).

Therefore, specific steps were taken to ensure that data is not loss, nor the important information repeated. The steps in Factor Analysis are to select and measure a set of variables, prepare the correlation matrix, extract a set of factors (latent variables), rotate the factors (if necessary) to increase the interpretability, and ultimately interpret the results (Pallant, 2001). These steps guided the data management process, and ensured that the data analysis follows an objective process that translates to valid outcomes. It is

worth noting that a factor is more easily interpreted when several observed variables correlate highly with it and do not correlate with other factors. This factor further justifies the selection of factor analysis for analysis method for the research survey.

### **3.9.2.1 Requirements for Factor Analysis**

Factor analysis is not always an appropriate method to use, so the suitability of the data needs to be assessed to determine the appropriateness of using Factor analysis. To do this, we can use the method suggested by Tabachnick and Fidell (2007) which argues that the minimum requirement of cases for Factor analysis is 300 cases, and another method being the use of the Kaiser-Meyer-Olkin (KMO) test. Pallant (2001) proposed both methods for evaluating the adequacy and suitability of data. According to Pallant (2007) and Ho (2006) data set is suitable for factor analysis when the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value is 0.50 or above, and the Barlett's Test of Sphericity value shows a significant value (i.e. the significant value should be 0.05 or smaller).

### **3.9.2.2 The Kaiser-Meyer-Olkin (KMO)**

Kaiser-Meyer-Olkin (KMO) is measure of sampling adequacy that used for evaluating the adequacy and suitability of the data. The KMO statistic varies between 0 and 1. The value of 0 indicates that the sum of partial correlations is large relative to the sum of correlations, indicating diffusion in the pattern of correlations (hence, factor analysis is likely to be inappropriate). The value close to 1 indicates that patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors. Kaiser (1974) recommends accepting values greater than 0.5 as barely acceptable.

In this study, the Kaiser-Mayer-Olkin KMO Sampling Adequacy Value was computed using the SPSS package Ver.20, and the result was (0.615), exceeding the recommended value of 0.50, which shows that the sample size is adequate and good (Field, 2005). Factor analysis is used to perform inferential statistics which was based on inductive approach (Laudau and Everett, 2004), and for ensuring that the interpretivism philosophy can be used to explain the ontology, epistemology and axiology of the themes that emerged from results. This means that if anyone subjects the data collected from the research



questionnaire to same process, the same results shown in this research will be achieved (Brace, 2008).

### **3.9.3 Data Reliability and Validity**

Reliability is defined as the extent to which results are consistent when subjected to different time frames, reproduced under same methodology and through similar research instruments (Creswell and Miller, 2000). However, reliability can be subjective and influenced by the mood and conditions in which participants are at a given time (Healy and Perry, 2000). For example, if the participants are interviewed under the same conditions after three months from the first interview, will their responses might be explained in different way or manner depending on this mood in which they are (Creswell and Miller, 2000). Stenbacka (2001) explained that reliability within qualitative research is measured based on the quality of the information provided and the purpose which is to “generate understanding”.

Therefore, to ensure the reliability of the data collected in this research, application, consistency and transferability of the information provided by the participants will be paramount (Healy and Perry, 2000). Also, Davies and Dodd (2002) states that reliability in qualitative research is based on the neutrality of the participants to provide information relating to the research theme irrespective of the mood they are in at the given time. However, the research questions are not ones which will trigger any emotions or stress in participants and the need to ensure neutrality, credibility and consistency has informed the decision to use semi-structure interview (Davies and Dodd, 2002). Since absolute reliability might be challenging to achieve in qualitative research Patton (2001), the participants have been selected based on their experience in the research theme, while questionnaire which engaged different people also produced complementary data.

The participant selection criteria and the data collection type have been chosen to ensure reliability and validity of the information collected from the research participants. Data for this research were treated in a professional manner and in ways in which the researcher had minimal manipulation of the data (Kumar, 2014). Data collected through the interview were coded so that the participants are anonymous and to avoid confusion of names since many people bear similar names in the UAE. Through this means, consistency of data was maintained and data were assigned into categories and were

analysed based on codes. This justifies the selection of data collection techniques which also helped to minimise any personal influence or biases from the participants and researcher as well.

Similarly, this justification helps to ensure validity of data and research findings based on the critique of Stenbacka (2001) about validity in qualitative research. Punch (2005) argued that validity in qualitative research is subjective and can be measured in terms of trustworthiness and ability to establish confidence in the findings. However, Davies and Dodd (2002) emphasised that the concept of rigor and reflexivity are essential in ensuring validity when using interview to collect data and this can help to establish confidence the research findings.

Furthermore, using case studies, documentation and questionnaire survey further ensured that data is consistently refuting the research premise, confirming it or helping to identify gaps which further increased the data validity. The research ontology, epistemology and axiology which finds roots in existing theories, concepts, standards and practice of crisis, emergency and disaster management also proved useful in increasing the validity of results as outcomes were cross-referenced with existing philosophical stance in the research field.

Despite the criticism and arguments of validity and reliability of qualitative data, it can be inferred that reliability, validity, quality and rigor are all terms used to differentiate “good” data from “bad” data. Therefore, the research questions are asked to provide more understanding and encourage the participants to provide information which can explain the issues peculiar to managing extreme events. The questions also linked back to the research objectives, Table 3.7 shows the relationship between the research objectives, and the strategies and data collection techniques selected to achieve the objectives.

**Table 3.7: Research Objectives, strategies and data collection techniques**

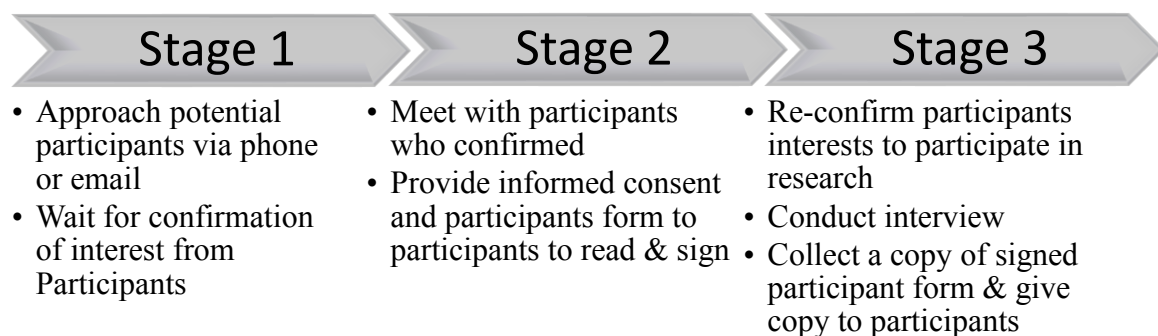
<b>Research Objectives</b>	<b>Strategies used</b>	<b>Data collection Technique(s)</b>
<b>To define major emergencies and contingency planning from literature and UAE context</b>	<ul style="list-style-type: none"> <li>- Literature review</li> <li>- Semi- structured Interview in ADP, CD and NCEMA</li> </ul>	<ul style="list-style-type: none"> <li>• Secondary data</li> <li>• Primary data</li> </ul>
<b>Examine current practices and arrangements in UAE government authorities for dealing with manage emergencies</b>	<ul style="list-style-type: none"> <li>- Review reports &amp; national framework for managing emergency in the UAE</li> <li>- Survey &amp; semi-structured interview in ADP, CD and NCEMA</li> </ul>	<ul style="list-style-type: none"> <li>• Secondary data</li> <li>• Primary data</li> </ul>
<b>Critically evaluate best practices and lessons learned from managing major emergencies in other countries and in the UAE</b>	Case study evaluation of MEs in Japan, US, UK, New Zealand and UAE	<ul style="list-style-type: none"> <li>• Secondary data via case studies evaluation</li> <li>• Primary data</li> </ul>
<b>Critically assess challenges for dealing with, drivers for improving and barriers that hinder the ability to improve response arrangements for managing major emergencies in the UAE</b>	<ol style="list-style-type: none"> <li>1. Review of case studies and literature on managing emergencies in Japan, US, UK, New Zealand and UAE to identify challenges, barriers and drivers.</li> <li>2. Survey and semi-structured interviews</li> </ol>	<ul style="list-style-type: none"> <li>• Secondary data via case studies</li> <li>• Primary data collected from officers in ADP, CD and NCEMA</li> </ul>
<b>Develop guidelines as recommendations for contingency planning and managing major emergencies in the UAE</b>	Analysis of all research findings from the first to fourth objectives	Triangulation of all data

As noticed in Table 3.7, the research objectives had informed the strategies and techniques used as explained in this chapter. It can be inferred that since the research objectives were derived from the study aim, both research aim and objectives had informed the methodology and increased the validity and reliability of the results. The understanding and knowledge derived from the literature review and methodology chapter were also used as guidelines throughout this research investigation process in order to establish confidence in the research findings.

### 3.10 Research Ethics and Challenges

This research methods and instruments for collecting data have been carefully selected based on ethics considerations and regulations of University of Salford. Appendices A and B are research approval and consent form which are evidences of adherence to university regulations and research requirements. Ethics is an important aspect of any research which provides regulations for reducing danger for the researcher and the participants (Kimmel, 2007). Ethics when observed and rigorously carried out helps to prevent the possibility of violating any public, health, safety or organisational laws (Kimmel, 2007). Flick (2008) states that researches often involve collecting and handling data which requires certain level of confidentiality especially when vulnerable people are involved.

While vulnerable participants are not involved in this research nor will be recruited as participants, it is possible that some participants may request for anonymity to participate. To ensure that all views, concerns and expectations are well managed for the field work, the university ethics guidelines for fieldwork were put into consideration when drafting the research questions, consent and participants' information form. The participant and informed consent form were necessary to provide overview of the research, its purpose and how the data collected will be used. The investigation and field work were subjected to this process outlined in the diagram below.



**Figure 3.4 stages for research participation (Alshamsi, 2014)**

Figure 3.4 expresses the stages followed for recruiting research participants and for encouraging participation in the research investigation. While no major health concerns pertaining to this research process, all cautions will be taken when conducting interviews

at the participants' offices. Although the researcher is also an officer in ADP and have had contacts with NCEMA when carrying out operational duties, the investigation process was still in line with all ethical considerations.

However, some participants were unwilling to participate during stage 2 shown in Figure 3.4, because of Eid holiday and busy schedule. According to ethics guidelines, participation was voluntary so that participants can withdraw without any fear or persecutions (White, 2009). While this delayed the interview process, the interview continued after the Eid holiday to ensure that the quality of data collected is not compromised.

Another challenge was that the initial participation for the questionnaire was insufficient, but the researcher managed this problem by administering the questionnaire in person and by explaining the importance and aim of the research to participants. Once this was done, the required numbers of participants for the questionnaire were achieved. Regardless of the research techniques used, all procedures for primary data collection ensured that health and safety issues are managed and risks were prevented. It also means as peculiar to this research, participants comments are protected and coded ensuring that all participants have right to participate and right to withdraw.

Although the researcher is from the country being researched, it is evident from this ethics review that this research does not pose any major threat due to the stages the research participation is subjected to. Furthermore, some participants were unsure of some facts, figures or details of past events or logistics. To manage this problem and to ensure that data is valid, information provided about past events were subjected to verification by double checking with other participants, reports written by organisation or incident accounts regarding the incidents mentioned (Stenbacka, 2001). This process helped to manage the problem as well as ensure the validity and reliability of the data collected and to ensure that results are repeatable for analysis purpose (Healy and Perry, 2000).

Another limitation in this research is level of confidentiality of some reports being solely used for operational purpose only. This limitation was managed by drawing best practice and learning mechanisms from case studies of ME in Japan, US and UK who have experienced ME in the past. Reference for the UAE incidents of ME were drawn from accounts provided by valid online newspapers in the UAE who have partnership with the

emergency agencies to cover public events relating to safety. This helped to manage the problems of limited reports in the public domain.

### **3.11 Summary of Chapter Three**

This chapter has examined the methods used to generate appropriate data for quality and credible results. The research methodology concepts have been critically explained, which also led to the explanation of research philosophies and the justification for selecting interpretivism research philosophy as the more appropriate philosophy for this research topic. While other philosophical underpinnings provide detailed explanations of the world, interpretivism was justified to be more applicable to explaining this research area as it fits more into the characteristics of non-experimental research. Although there are limitations in the research methods and strategies chosen for this research, the limitations are reduced by using multiple and mixed methods and strategies.

Several research designs were also examined based on their ability to ensure that the appropriate data are collected from primary and secondary sources in the most reliable way and to produce valid results. While this process helped to identify other means, which researches can be undertaken, it has also helped to determine the most objective selection criteria for research participants. Tables and figures were used in this chapter to clearly illustrate how the research participants were selected, relationship between data methods, participants and research objectives. A review of the research ethics has explained how this research was subjected to a rigorous process to ensure validity, reliability, safety and consistency in this research.

Further explanations of validity and reliability indicated that validity and reliability for this research was achieved through the combination of different but complementary strategies. It is through this combined and rigorous research process that good and quality data were generated, collected and analysed to boost confidence in the research findings. Above all, the rigorous process explained in this methodology chapter justifies the importance of this chapter to the entire research process.

## **CHAPTER 4: Results and Analysis of Primary Data**

### **4.1 Introduction**

This chapter presents results of primary data collected through questionnaire survey and semi-structure interviews. This is done in accordance with research methodology selected and justified in chapter three. Sections in this chapter presents and analyses the findings obtained from the qualitative and quantitative data. The last section summarises the findings of this chapter and provides context for the next chapter.

### **4.2 Interview Findings and Analysis**

Based on the critical evaluation done in chapter two and three, data collected through the semi-structured interview are crucial for understanding the reasons the gaps identified in previous chapters exist. As specified in the methodology chapter, the fieldwork was conducted in the United Arab Emirates (UAE) in two cities where experts were engaged. Three statutory organisations, namely, Abu Dhabi Police (ADP), Civil Defence (CD) and National Emergency Crisis and Disasters Management Authority (NCEMA) participated through interview sessions or completion of questionnaires.

Subsequent sections in this chapter presents findings and analysis of primary data gathered through the engagement with experienced personnel in the field of emergency management in the UAE. They qualify as experienced because of their years of experience working in the planning and operations department and their direct involvement in either responding to past Major Emergencies (ME) or planning for future ones. To ensure that the semi-structure interview is maximized, the interviews were conducted with three categories of participants, namely:

- Gold level Manager from Civil Defence in Dubai;
- Expert from Crisis and Disasters Management Authority in ADP;
- Expert from planning department in NCEMA.

These participants are represented using codes in Table 4.1.

**Table 4.1 Profile of all interviewees**

<b>Organizations</b>	<b>Departments</b>	<b>Codes</b>
ADP	Operations department (Silver level)	A1
	Foreign expert working in operations department	A2
	Crisis and disaster management department (Gold level)	A3
	Operations department (Silver level)	A4
	Crisis and disaster management department (Silver level)	A5
Civil Defence	Civil Defence (Operations for satellite cities/towns)	B1
	Civil Defence (operations department) (Silver level)	B2
	Public safety and emergency department (Silver level)	B3
	Public safety and emergency department (Silver level)	B4
	Public safety and emergency department – paramedic unit	B5
	CD Manager in Dubai (Gold level)	B6
NCEMA	Operations Department (Silver level)	C1
	Operations department (Silver level)	C2
	Prevention and safety department (Gold level)	C3
	Planning department (Silver level)	C4
	Planning department (Silver level)	C5
	Prevention and safety department (Silver level)	C6

The profile of the interviewees is important in order to establish the relevance of their roles and profile to the themes and study area, thus verifying their competence in providing relevant answers to the research topic especially in providing in-depth information on gaps identified in the literature review. As seen in Table 4.1, a total of 17 experts all in strategic level (Gold) and tactical level (Silver) were interviewed.

#### **4.2.1 Major Emergencies – Definition and understanding**

The data for this section was collected through semi-structure interviews with ADP, NCEMA and Civil Defence strategic (Gold) level officers. The inquiry for this section was limited to Gold level officers because of the need to clarify the meaning and explanations of Major Emergency (ME) and Contingency Planning (CP). This data relates to the first research objective, which is *“to define major emergencies and contingency planning from literature and UAE context”*. Themes sought in this inquiry relates to the description of ME as an overwhelming event or as an event that escalates as a process until it exceeds capacity for response. To this end, the interviewees were asked to explain what ME and the circumstances they consider as ME in the UAE.



To this inquiry, all the interviewees (A3, B6, and C3) state that there is no definition of ME in the UAE or in their organisation. However, they provided different explanation and personal views of an emergency situation to inquire of its similarity to ME.

Interviewee A3 explained that definition for emergency situation is: *“a sudden unexpected event beyond the normal response capabilities and requires the intervention of an organisation or more”*

Interviewee B6 said: *“...no definition of ME, but an emergency situation is event that occurs suddenly and requires the support of several parties to respond and using the emergency procedure guide we are able to reach the desired result and complete the response task”*

Interviewee C3 have similar views as B6: *“In general, there is no definition of ME, but it can be a definition of emergency situation which is; any event that may happen abruptly and impact on society and human beings”*

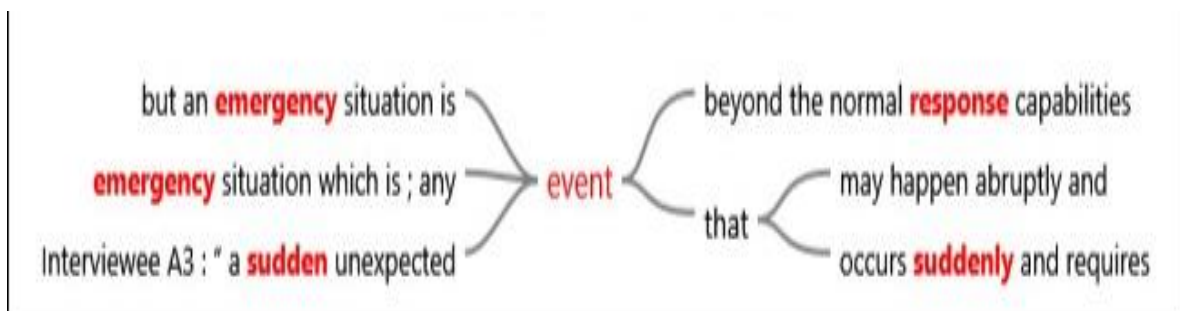
Although information provided was for an emergency situation which is just routine emergency that does not escalate nor prove difficult to manage, and that can be managed by one agency in the UAE and not ME. The answers provided by the interviewees were ran through Nvivo software to identify if any of the themes relevant to definition and description of ME identified in the literature review exists in the definition of emergency. Figure 4.1 shows the outcome of the word frequency query for this investigation in content analysis format.

event	respond	definition	emergency	using	organisati	parties
		abruptly	requires	beyond	general	human
happen	beings	capabilities	situation	complete	may	several
				desired	normal	unexpected

Figure 4.1 NVivo word frequency search in content analysis format

It can be noticed from Figure 4.1 that emergency in the three main organisations responsible for response to any scale of emergency is considered as “event that happen abruptly/unexpected”, “response beyond normal capabilities/organisations, “that require several organisations/parties”.

However, phrases like “response beyond capabilities/ organisations” tend to be the closest to the explanations and characteristics of ME reviewed in chapter two. This phrase may also be considered as similar to explanation of ME as an event with overwhelming onset or as an emergency situation that escalates through a process that it becomes ME which exceeds normal capability for response. However, when same responses were analysed using Nvivo text search query, Figure 4.2 shows the outcome.



**Figure 4.2 Text search query for explanations of Emergency in UAE**

It can be seen in Figure 4.2 that while there is lack of definition for ME, there is also limited data on definition of emergency and characteristics that explains it. However, it can be noticed (words in red) that emergency is described as “sudden unexpected event beyond the normal response capabilities” or the “emergency situation or any event that may happen abruptly” or “occurs suddenly”. ME on the other hand can be foreseen or sudden, therefore the evidence of ME is lacking in the definition and description of emergency in the UAE.

Following this, all three interviewees provided description of incident or circumstances that may be considered as ME in UAE. Interviewee A3 stated that, from his experience the events are:

*“Critical incidents that may or may not include VIP people, something that will impact the reputation of the country, and one that requires the intervention of one of more*

organisations”. He supported his statement with an example of flood incident that happened in March 2016 *“Incidents that leads to death, involves large number of injured people, affects the reputation of the institution or the state and may affect or affects the economy”*.

He adds *“... If it has serious consequences on a large scale and requires the direct intervention of top-level strategic and more than one organisation and multiple organisations to respond”*. *“...Requires the activation of strategic level of response because response goes beyond the capacity of emergency team at the local level of the emirate. It requires the support of the leadership of the incident from all other organisations (governmental and non-governmental organisations).”* From this response, it is only the last statement (underlined) that is closest to meaning to the nature of ME and its occurrence.

Interviewee B6 mentioned that: *“Incidents such as rains and floods, fires started and that occur by the proportion of large losses and efforts, wars and earthquakes and landslides”*. *“.. a huge and large event” “...need national and local response to deal with. Will, also require response from several quarters and one that will further raise the status and readiness of the institution”*.

Interviewee C3 mentioned that; *“It is a sudden event that threatens the lives and properties of people and need major emergency organisations to handle and support from every quarters of the country or city. Examples are major fires, floods where the repercussions are more serious if neglected.” “...it will be a large-scale event that requires national level involvement. One or more city (emirates) will need to management it. It will require level one (local), level two (federal) and level three (national). Example of this scale of event is the H1N1 which was national level event”*. *“... it will be effectively managed by several organisations, and the role and responsibilities of each sector are showed in the general framework of the response”*. He refers to the website that *“The general framework of response can be found at NCEMA website”*.

It can be noticed that the explanations provided for ME are also similar to the definition of emergency analysed using content analysis and Nvivo software. There is no reference to words like escalation, overwhelming onset (although large scale may qualify for this),

but reference to reputation of the organisation or the country. C3 also emphasised that ME can be effectively managed by several organisations using the response framework, but the case studies examined does not reflect any effective response. Since the answers provided further confirms gaps identified through the case study evaluation that the understanding of MEs is limited, the next section examines current position or perspectives on contingency planning.

#### **4.2.2 Contingency Planning**

Three strategic level interviewees were also asked to clarify what they understood as Contingency planning. All three respondents, A3, B6, and C3 explained that there is no definition of contingency planning, but they provided their personal views and explanations.

According to interviewee A3 there is no definition for CP, but explained that: *“I believe we have contingency planning involved in our preparedness process. Because we have process and plan that refer to example of ME that needs to be better managed and definition of consequences and impacts of these events if not properly managed, preparation and analysis for response and documented response arrangement that will be implemented when ME occurs”*. He also adds that there is *“no plan or planning process that shows the lessons learned from dealing with past ME”*. This emphasises the lack of CP and an indirect acknowledgement of lack of steps for CP in their organisation.

Interviewee B6 has the same answer as interviewee A3 by confirming that there is no specific definition for CP in his organisation. As well as he stated from his point of view that they have ‘Emirates guide’ for fire protection and the protection of lives in the laws, legislations and policies and there are procedures that guide the procedure for dealing with ME (B6). He further said that: *“...the procedure makes reference to example of incidents that are ME and which need special arrangement for response, no written reference to past lessons learned, consequences and impact, preparation analysis and response planning and implementation”*. The next interviewee has further explanations regarding CP.

Interviewee C3 adds that they only have definition for emergency which is ‘*an event or a total of major events predicted serious damage to individuals or property or threaten public order or the continuity of government action and the need to mobilize private or format from several quarters*’. He adds “...*this is called (policy) and there is this policy at the national response to the general framework*”. Also, he mentioned that “...*there are examples in federal plan of ME, consequences and impacts, planning analysis and how to implement response arrangement*”. He adds that “*in each plan, there are modifications and observations of the plan, and are attached at the end of the plan transcript and model when we update the plan to go to the observations that we studied*”. He also states that there is no organisation definition for CP (Figure 4.3).

Name	Sources	Refere /
Definition and concept	0	0
Enablers help	1	1
Sudden Unexpected	3	3
ME Circumstances	0	0
Events	3	3
Size, scale and process	3	3
Nature of response	3	3
Contingency Planning (CP)	0	0
Organization	1	1
Personal views and explanations	3	3

Interview A3 from ADP Obj1 Interview B6 from CD Obj1 Interview C3 from NCEMA Obj x

Click to edit

3. What do you understand by contingency planning?

- Organisation's definition

NCEMA – There is no organisation definition for contingency planning. In NCEMA we have only definition for emergency which is – “an event or a total of major events predicted serious damage to individuals or property or threaten public order or the continuity of government action and the need to mobilize private or format from several quarters. This is called (policy) and there is this policy at the national response to the general framework”

- Personal views and explanations

NCEMA –

**Figure 4.3 NVivo text review of lack of CP in NCEMA**

Figure 4.3 shows an example for the interview about CP and lack of definition or its context. Even without definitions for CP, many respondents believe that there is a measure in place to deal with unexpected events/incidents. However, according to the literature review, ME are not unexpected events, they may be foreseen or unforeseen. As explained by Mitroff (2004) and Turner and Pidgeon (1997), it is their overwhelming onset, scale, nature and process through which emergency escalates that makes them ME. The next section summarises the results for this objective.

#### **4.2.3 Synthesis of Major Emergencies and Contingency Planning**

The data for this section was collected through semi-structure interviews with ADP, NCEMA and Civil Defence clearly indicate that there are no common explanations and understanding of ME and contingency planning. While all interviewees made attempt to explain ME and CP from their personal views, it is evident that lack of common perception, understanding and knowledge of the trigger points or characteristics of ME and components of CP may have been responsible for continued occurrence and impacts of ME.

In the literature, Schneider (2004) explained contingency planning as measures developed to prepare for and to react to possible event and/or event escalation which exceeds normal response efforts and whose impact can severally affect security, resources, assets, human and the society. It is however evident from this result that there is need for education and improved understanding of what constitute ME and CP from existing literature and its application within UAE context. It can be observed from expert interviews that the deduction made in chapters two and three that there is lack of understanding of ME and CP in the UAE is correct. The result shows that there is understanding of emergency or routine event and how to deal with them.

However, there is lack of consensus amongst the emergency organisations on what ME is and the arrangement that will be sufficient for dealing with their onset, their escalation and mitigation of their impacts. The ultimate reasons for this, is due to lack of information and understanding of ME, lessons learned and mechanisms of learning and utilising lessons, and steps for contingency planning as well as elements of effective contingency planning. This result is evident from the data collected from the interviewees since the themes or sub-themes are sufficiently identified nor explained, but barely implied in all the answers. This gap and limitation warrants strong recommendations and contributes to context of the guidelines to be proposed. However, there were answers from the silver level participants that also provide more perspectives on MEs and CP.

#### **4.3 Interview Results for Research Themes**

This section presents results from interviews conducted with sixteen participants from Civil Defence, ADP and NCEMA. The data in this section focuses on achieving part of objectives two, three and four. Hence, data analysis in this section is analysed against

themes relating to effective contingency planning or emergency planning and response phases, lessons learned from past ME, challenges, drivers for improvement and barriers that may hinder management of ME in UAE.

**4.3.1 Current EM Practices and Arrangements for MEs**

The data collected is based on the question regarding practices and arrangements in order to examine the level of preparedness in relation to capability for dealing with ME. In reaction to this, the interviewees were asked to describe the current practices and arrangements used by the UAE government in managing major emergencies when they occur is sufficient enough in managing major emergencies. Most of the interviewees describe aspects of existing practices, arrangements and level of preparedness in the UAE for managing ME when they occur. These aspects including: “Sufficient, Need improvement, Not enough, and Reasonable in some incidents”. Only one respondent said “he doesn’t Know” as indicated in Figure 4.4.

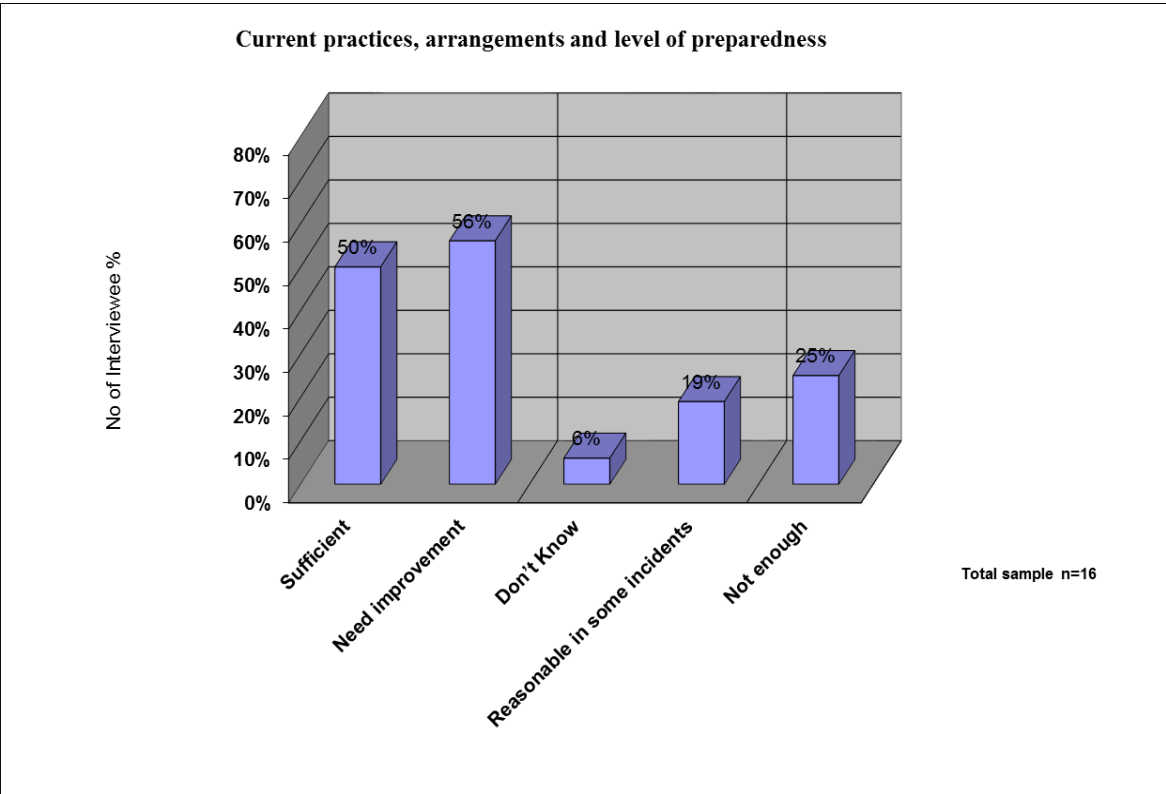


Figure 4.4 Current practices, arrangements and level of preparedness for ME

Figure 4.4 shows the current practices, arrangements and level of preparedness in major emergencies. The majority of the interviewees declared that the current practices, arrangements and level of preparedness need improvements. In this matter, interviewee (A1) stated that *“it is good but not enough”*. He adds it *“needs improvement”*, and he explains the reasons for improvements: *“It also needs regular improvement, because there is new risk and evolving risk such as Arab spring. Because the events are getting worse, so we need to improve the system. UAE is progressing/advancing dramatically. e.g. have nuclear energy station and all emergency agencies need to follow this development.”* Figure 4.4 shows a sample of the code summary for interviewee (A1) using Nvivo software.

22/08/2016 22:51

### Coding Summary By Source

#### Major Emergencies (ME)

22/08/2016 22:51

Classification	Aggregate	Coverage	Number Of Coding References	Reference Number	Coded By Initials	Modified On
<b>Document</b>						
Internals\\InterviewA1						
<b>Node</b>						
Nodes\\Contingency plan for ME\\Training						
No	0.0133	1				
			1		H	22/08/2016 11:25
Nodes\\Current practices and arrangements\\Need improvement						
No	0.2811	2				
			1		HAMDAN	22/08/2016 22:26
There is a plan for response and we did update regularly. We're doing training to determine the capacity of the team and if the team is capable or good enough for response. But improvement is needed, because we train without prior preparation. To measure the effectiveness of this plan, to make meeting with agencies/partners regularly. Try to ensure that response time is 4 minutes. (If something happens we need to react by 4mins.						
			2		HAMDAN	22/08/2016 22:27
It's good but not enough. It also needs regular improvement, because there is new risk and evolving risk such as Arab spring. Because the events are getting worse, so we need to improve system. UAE progressing/advancing dramatically. e.g. have nuclear station and have all emergency agencies needs to follow this development.						
Nodes\\Key Drivers\\Experience						
No	0.0812	1				
			1		HAMDAN	22/08/2016 21:52
formation of specialised team and they have enough experience for planning. And make comparison and studies with countries which have experienced extreme disasters before. Help from expert people from other countries.						
Nodes\\Lesson learned\\Report						
No	0.0419	1				
			1		H	22/08/2016 11:17
Yes, there are opportunities for improvement and lessons learned. The need to also do report after each incident.						

Figure 4.5 Sample of Nvivo report on ME



Figure 4.5 shows that emphasis is placed on having a plan for response that on incorporating lessons learned from dealing with past ME. Other activities in figure 4.4 also shows that response actions are given the most priority. Furthermore, explanations on the level of preparedness for responding to ME, the same interviewee answers that *“there is a plan for response and they did update regularly”*. He adds that they *“conduct training to determine the capacity of the team whether they are capable or good enough for response. However, improvement is needed, because the training without prior preparation is not adequate, as the target to ensure that response time should be within four minutes from incident occurrence”* (Interviewee A1).

Moreover, interviewee C2 and interviewee C3 have the same point of view in terms of current practices, arrangements and level of preparedness by emphasising that there is need for improvement. *“Despite availability of infrastructure in some federal authorities responsible for managing ME, there is still need to improve the integrated infrastructure, such as staff communication, response services, resources, signed agreement with the partners, and training programmes”*.

The interviewee C2 mentions the readiness of National Operation Centre in comparison with the Federal Authorities. In this esteem, he stated that: *“It is average and there is need for improvement. The national operation centre necessary to manage any emergency according to the emergency level, but there is no readiness for federal authorities, which can affect our centre to be in good preparedness. While we are ready, other centres are not ready which affect our work.”*

Even more, interviewee B3 explain that they have good emirates team for search and rescue, but the need is for develop additional teams in other situations. He further added: *“...develop emirates team for search and rescue and it is internationally seeded or recognised. The need to develop another team for water bodies and another team dealing with hazardous materials such as CBRN. Practically they are good enough now – but there is a conflict of roles and lack of cooperation between some agencies and this is because they don’t have clear response work plan between agencies involved in response.”*

On the other hand, half of the interviewees declared that the current practices, arrangements and level of preparedness are sufficient and good. One of interviewees (A5) explains in details that the current practices are:

*“Effective and good. It is effective and covers the immediate response and success for any emergency and disaster. The it depends on according to many references and we put some editing on it and we’re doing the training yearly for all sectors responsible and it becomes completely understanding from implementing and all of them know their roles and duties. We have different plans for changeable events and exercise builds on assumptions and different scenarios from simple emergency events to extreme disaster and crisis. We’re doing regular assessment and there’s a committee from the ministry of interior doing this assessment regularly.”*

In contrast, another interviewee (B1) indicated that the UAE government implements best practices and exercises used in the world, and arrangements are on-going to choose qualified individuals and give them specialized courses. As well as, the government is seeking the establishment of specialized institutes and colleges that focus on these issues. However, same interviewee added that they have some concerns especially on issues which are out of their control, and provides some examples: *“Effective and good, but there is default on issues that get out of our control such as when people gather during peak times and not to give an accurate description of the scene when an emergency occurs. Also, we need smart maps.”*

Furthermore, one of practitioners (B2) describe his experience when the organization was involved in managing past ME as: *“...the good practice we coordinate with partners for response procedures. Each emirate was doing training for local level and doing training for strategic level for all partners and sectors responsible for such procedures. We’re doing training also to find how each emirate can give support to other emirates to understand role of other agencies. All the plans effective from our training”.*

Four of interviewees stated that the current practices, arrangements and level of preparedness are not enough. In this regard, the interviewee A4 declare that because of security challenges the arrangements are *“not enough and because the security challenges*

*are very difficult to manage. All countries are vulnerable to certain risks of security now, more than before, and new risks require better readiness. Readiness should be better”.*

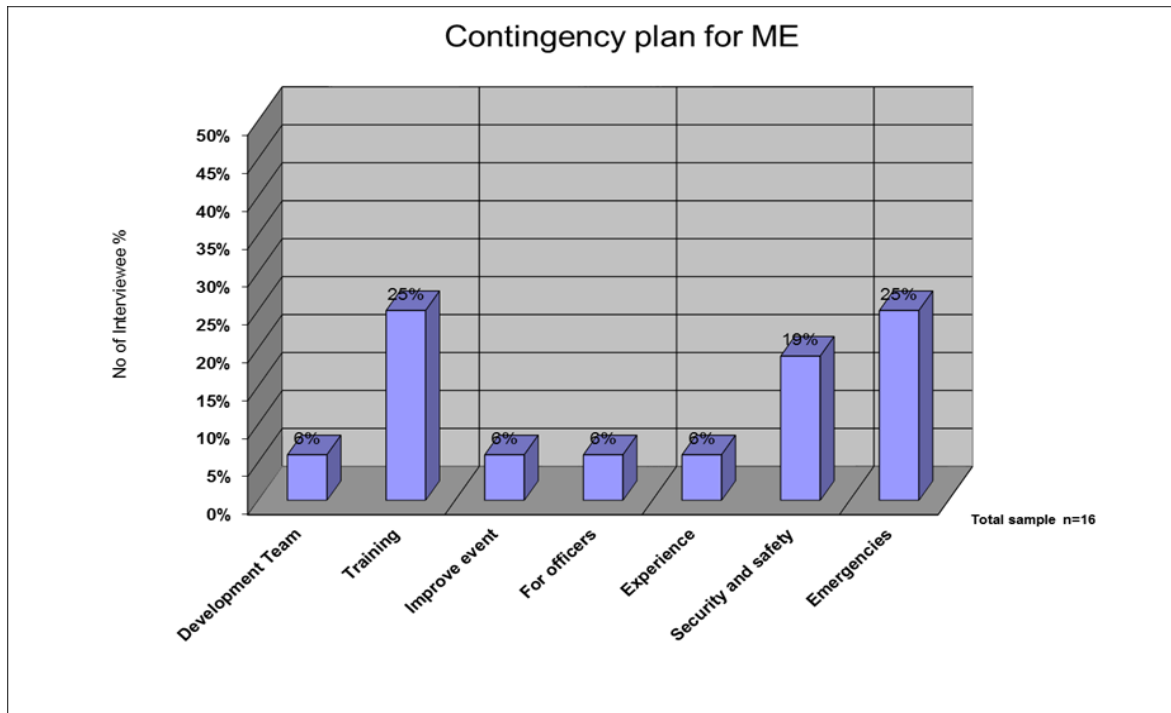
In the same context, interviewee C1 explain the reasons why the current practices, arrangements and level of preparedness are not enough: *“Not good enough practices include lack of doctrine and procedures between all the organisation and most of authorities have their own standards which are different from others. Especially for the command and control system, and operation centre management which all need to be improved and developed. We need doctrine and joint procedures for risk assessment and joint planning and communication systems.”*

Another element was mentioned by three of interviewees which is ‘Reasonable in some incidents’. In this context respondent C3 stated that the current practices, arrangements and level of preparedness are reasonable in some incidents but need further enhancement in other areas. This respondent gave example of incident called CBRN in UAE: *“Yes, in some incidents, but in other incidents we need more improvement in this area, because for example, incidents like CBRN. We’re working to update and develop some plans with partners, for example plans such as evacuation shelter.”* Also, interviewee C6 compare two incidents; Cyclone Gonu and Phet, he stated that the response was better in Phet compared to cyclone Gonu. Interviewee C6 gave the reason as due to the role of NCEMA which is the organisation that now has a coordination role, identifies duties and plans for response.

#### **4.3.1.1 Evidence of Contingency Planning for ME**

In an attempt to further examine the current practices and arrangements in the UAE and investigate the evidence of CP for dealing with ME, the interviewees were asked to confirm if they have contingency plan for major emergencies, or it is just sets of actions every responder must know.

This question is asked to further probe the system from officers at the lower level than Gold level officers already interviewed on this theme. As answer to this question, the participants mentioned a list of contingency plans for ME include the following; team development, training, improving event and improving officers, security and safety, and emergency plan illustrated in Figure 4.6.



**Figure 4.6 Examples of contingency plan for ME**

Figure 4.6 shows that different plans are considered or called Contingency plan in the UAE. For example, one interviewee answer yes, they have contingency plan for major emergencies especially nuclear plan. Interviewee A1 declared that “...*Yes, the future plan is to make plan for nuclear plan. There is the development team working on procedures.*”

Four interviewees mentioned the training as one of contingency plan for major emergencies. In this context, interviewee A1 and interviewee A4 have the same point of view and they answered that “*Yes, CP is being used in the exercise and training*”. Interviewee A5 stated that: “*Used during the yearly training simulation in Abu Dhabi in different scenarios. And it is being updated regularly it depends on the event and new emergencies. Add new duties*”. Interviewee C2 answered “...*Yes, there are some plans for identified risks, but people need to be trained to use those plans*”.

‘Improving events’ is considered one of contingency plan for major emergencies. Participant A2 answered yes, that they are “*looking to have plans that can be used to improve events that can escalate*”. One of respondents (A4) answer that they have special contingency plan for officers in operations to deal with major emergencies. This plan provides link between officers and the crisis team, also the plan contains sections that teaches the officers how to use the resources and how to control them: “*We have plans*

*for in case of emergency planning for officers in operations on how to deal with it. We're still developing the plan, yet to be ready. We're still doing the plan for officers for the golden hour, until the crisis team comes to support. We're also teaching the officers how to use the resources and how to control them."*

Three of interviewees (interviewee A5, interviewee C3, and interviewee C4) answered yes that they have contingency plan for major emergencies, and they affirmed that it is a *security and safety plan*. Interviewee A5 answered Yes to the question and mentioned that the preparation of plans and all assumptions and potential threats depending on the risk register that affect the security and safety of the state.

In relation to Emergencies, four of respondents stated that they have contingency plan for some specific emergencies. In this view, interviewee A5 stated that they have general plan to respond to any emergencies and crisis event like fog accident and extreme fire. He confirmed that this plan is updated regularly: *"Yes, we have a general plan to respond to any emergencies and crisis event and distribute to all responsible sector in ADP. Yes, it's been used in Fog accident and extreme fire. Used during the yearly training simulation in Abu Dhabi in different scenarios. And it is being updated regularly it depends on the event and new emergencies. Add new duties"*.

In the same theme C2 stated that *"yes, we'll use it in any hazard to identify what we agreed in the plan, but there is still need for planning, during and managing the emergency"*. Interviewee C4 mentioned they have what called "plan support" for support main emergency plan, like evacuation plan, transportation plan, and medical one. Under emergencies theme, another specific plan was mentioned which is used for managing emergency like disease epidemic. In this matter, interviewee C3 answered yes to the question and talked about national plan for managing disaster and diseases.

Interviewee C3 in his explanations said; *"Yes; we're using it and doing exercise on it. The federal plan for managing disaster and national plan for diseases, epidemics or infectious disease, agriculture pests, epidemic that can affect animals, environment pollution plan (for oil and gas)." However, when all these explanations were analysed using content analysis and Nvivo, the results show that words relating to preparation, analysis, response planning and implementation which are peculiar to steps for*

contingency planning (UNHCR, 2011) were not found. The exact matches, stemmed words and synonyms searches and analysis only produced the outcome in Table 4.2.

**Table 4.2 Analysis for evidence of CP for ME in UAE**

<b>&lt;Internals\Evidence of CP&gt; - § 3 references coded [0.88% Coverage]</b>
<b>Reference 1 - 0.26% Coverage</b>
<i>for in case of emergency planning for officers in operations on</i>
<b>Reference 2 - 0.36% Coverage</b>
question and mentioned that the preparation of plans and all assumptions
<b>Reference 3 - 0.26% Coverage</b>
<i>there is still need for planning, during and managing the emergency</i>

As seen in Table 4.2, it appears only preparedness and planning (which is the first step for CP) is evident in the UAE. Thus, the general answers about whether CP exists for dealing with ME further stresses the lack of knowledge on what constitute CP especially with respect to what has been identified in this research in literature review. But the answers also show that only evidence of the first step of CP exists in the UAE, while other steps are unidentified or evident from the documents reviewed in chapter two and from the answers provided in this chapter.

#### **4.3.1.2 Results for Current Practices and Arrangements**

The answers provided by responders show that the current practices are mostly good for dealing with emergency situations, but there are varied comments on past ME and the effectiveness of response for dealing with ME. But in general, the findings reveal that current practice and arrangement may be insufficient or inadequate for dealing with ME in UAE due to their wide spread consequences of ME when they occur which is now more frequent. It can be seen that the interviewees showed awareness of factors that hinder effectiveness of the system and ones that cause problems for response. However,

it can be noticed that while some said plans were good and effective, others said some plans are not good and lack policies that can make them translate into effective implementation for response to ME.

In regard to the levels of preparedness the finding reveals that there are currently no CP, however, there are ongoing process or planning for various incidents that can be used for managing the challenges of emergencies like ME. Though, it can be seen from the answers that many claim plans and planning are done for risks and threats, but none mentioned to any aspect of the planning that is based on lessons learned from past incident(s).

None also mentioned the analysis that goes into planning nor how response planning is conducted to ensure effective response to emergency situation. Due to inability to identify any theme or sub-themes that relate to current arrangements from the literature review, it can be concluded that the current practices in UAE lack understanding of ME and CP. It also shows that the current practices are also insufficient for dealing with any large-scale incident and ME.

On CP, the results show that there is confusion about what is CP and its use. For example, the participants mentioned a list of contingency plans for ME as development team (which is rather vague in meaning) as CP is not used for developing teams, but for responding to ME. Training plan, event improvement plan for officers, security and safety plan, and plan for emergencies. All these types of plans do not fall within the remit of CP as identified in this research.

Except for A2 who acknowledged that “they are looking to have plans that can be used to manage events that may escalate”, no other reference or explanations to this question is close to what CP is. Therefore, there is strong need for raising awareness and educating on what ME and CP mean. Both good and bad practices have been identified in the current practice used in the UAE for dealing with situation considered as emergency. However, interviews show a good level of awareness of the current problems and challenges which abound in the system.

It also shows that attempts are being made to improve the system, but it seems the focus does not include steps for CP that can enhance response to ME. Nor does the ongoing improvement process incorporate mechanisms for lessons learned and elements of

effective CP. Therefore, recommendations are also required to address this gap and problems, but it is also important to identify lessons learned and best practice which is the essence of next section.

### 4.3.2 Lessons Learned and Best practices

Following the lack of evidence of CP for ME in the UAE, this section aims to identify evidence of lessons learned and to evaluate the best practices or/and lessons learned that may exist in the UAE. The following questions were asked to explain the lessons learned from ME and if they think lessons learned from last ME will be used in managing any future ME. The majority of the interviewees listed the lessons that have been learned from ME, including training, renovation work, report, build emirates team, experience, use of resources, operation centre and planning shown in Figure 4.7.

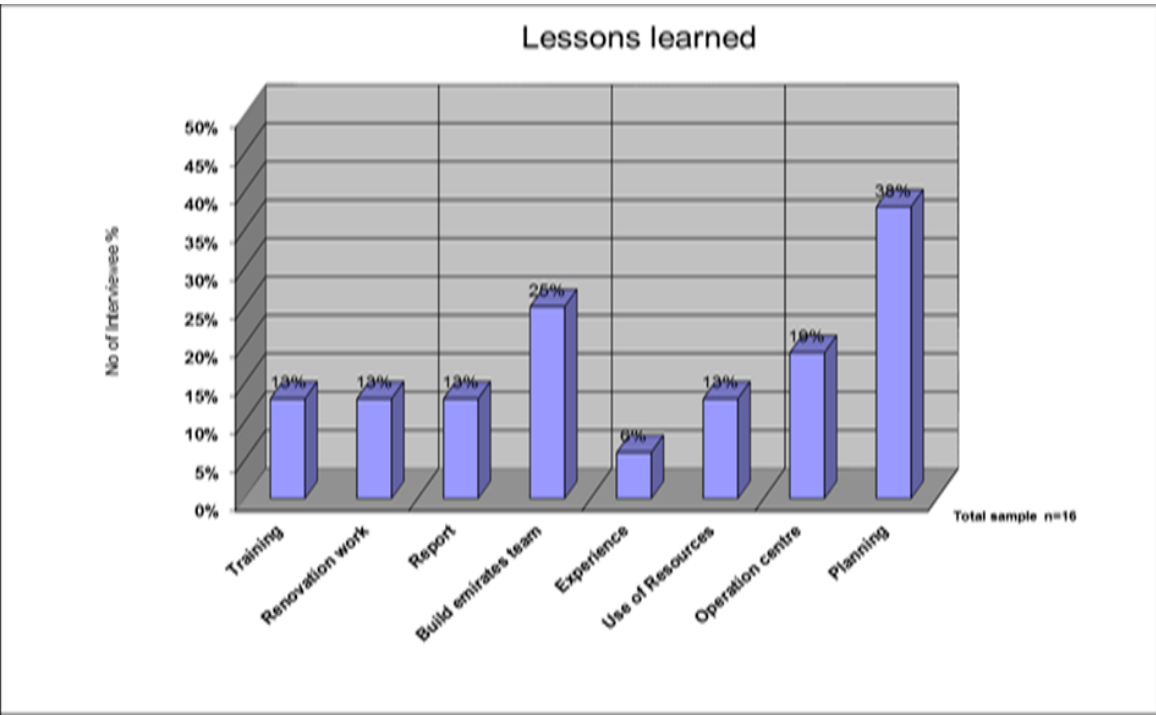


Figure 4.7 list of lessons learned from past ME

Two of respondents reveal that the training is one of lessons learned. In this matter, interviewee B1 stated that “yes, the lessons are learnt: Intensify the training process and activating the role of field survey to cover the competence centers”, and interviewee C4 stated “we did workshop to study what went wrong and we studied and then improve our ability to respond another fire which happened later”. The renovation work is considered



by two of respondents as one of the lessons learned from previous ME. In this context, one of interviewee mentioned that the renovation work of the fire stations in order to follow up on the needs and resources according to need areas (Interviewee B1). In the same subject, some respondent emphasised that report is one of the lessons have been learned from earlier ME.

Interviewee A1 says that the reports are done after each incident, and B2 has the same point of view: *“Yes, there are opportunities for improvement and lessons learned. The need to also do report after each incident. (interviewee A1)”*, Interviewee B2 said *“do report after all incidents to identify all positives and negative things and put all recommendations. There is opportunity to improve process and operations from past incident.”* In terms of building emirates team, four interviewees explained this as a lesson learned when the group of emirates rescue team were developed and their expertise where required for response to a cyclone.

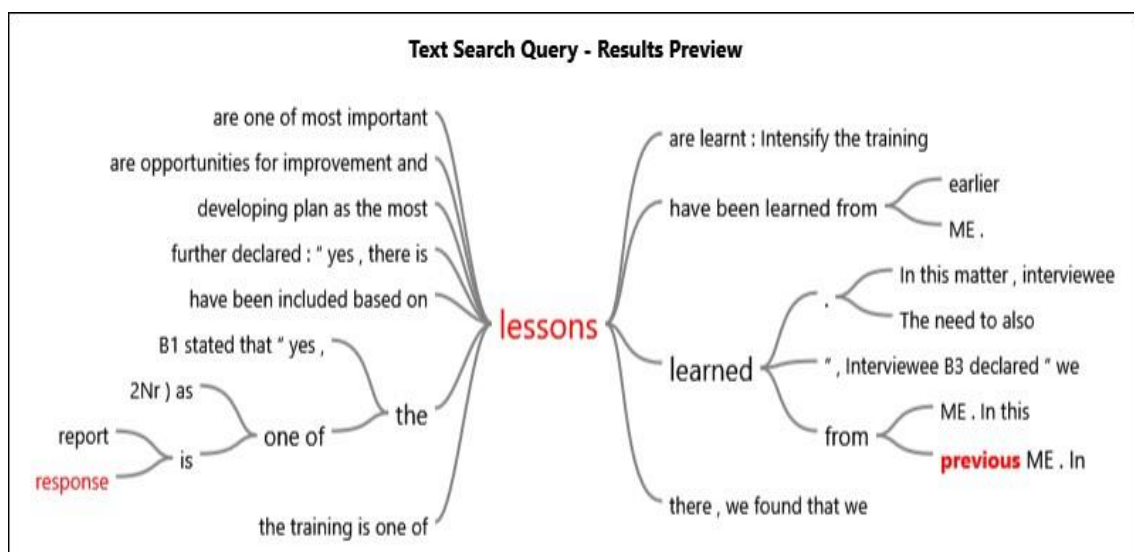
In this context, interviewee C3 mentioned: *“Yes, it is being used for preparedness procedures for the last cyclone. We sent emirates rescue team for water bodies and municipality and Red Crescent. And all these have been included based on lessons learned”*, Interviewee B3 declared *“we just have emirates team for water body, to be suitable to the difficult geographic nature to rescue people who are prone to water incidents. This team responded to last cyclone Ashoba which occurred in 2014. Although there was no major impact, there were teams activated to be on standby in case of severe impact of incident”*. Expanding on the issue, only one interviewee stated the lesson they learned is to garner experience for controlling and responding during the golden hour (interviewee B4).

Moreover, two of respondents stated that resources needed for response is one of the lessons learned from ME. Interviewee B5 said: *“Select the resources needed by emergency teams. There is lack of resources in the medical and ambulance team and failure to learn from the past”*. Three of interviewee found that having an operation centres are one of most important lessons have been learned from ME. Interviewee C5 mentioned the need to have operation centres for all parties, he further declared: *“yes, there is lessons there, we found that we need to have operation centres for other agencies and the response team and emergency management”*.

In relation to this, interviewee C1 pointed out to the importance of the need of operation centre for the civil authorities that can help them activate the plan and implement the plan. Another interviewee mentioned that they did use ready procedures and that is the guidance by national operation centre, but they need the other authority to have the same procedures for readiness (interviewee C2). Also, six of the interviewee considered developing plan as the most lessons learned from previous ME.

In this regard, C1 stated that: “...*We developed plan to activate the operation centres in the supportive government authority in emergency. We’re making plan to have joint plan, procedures and practices to bring everyone to work together.*” In the same manner, another interviewee A5 mentioned that “*Yes in case of response for any events, the right action may be taken and security measures for any extreme event that can happen within limitation of liability. It has been updated procedure for the plan according to the result we found it during leading with extreme disaster and that not being mentioned in the plan*”.

Interviewee C5 declared that they learned that they have to finish planning for all types of disasters, and identified and developed all the things that relate to the disaster. Figure 4.8 Shows NVivo analysis of interviewees answers when analysed within the context of lessons learned from literature review.

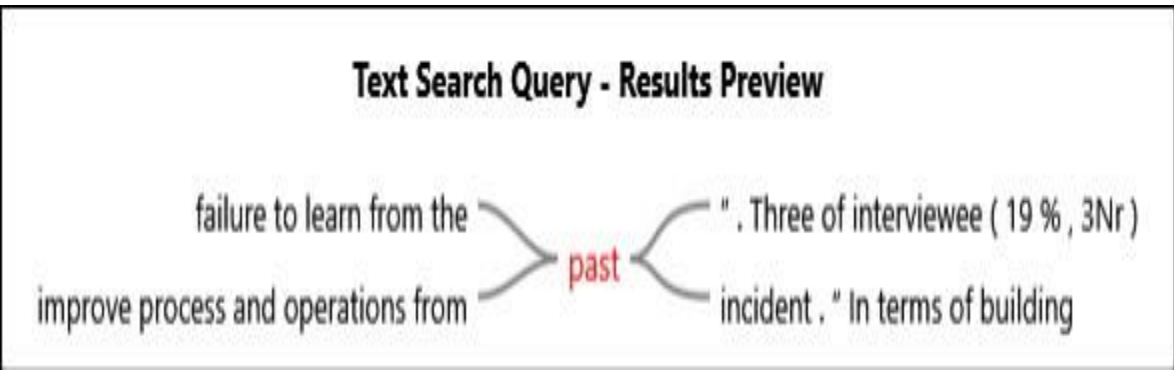


**Figure 4.8 NVivo text search query for evidence of Lessons learned**

As illustrated in figure 4.8, the lack of substantial evidence of lessons learned activities and mechanisms for using lessons learned inspire the importance of identifying challenges and drivers in the current practice. This confirms that in most cases, lessons are not being directly learned from past incidents and linked with current practice. It also further confirmed the assumption that challenges exist in the current practice and arrangements in the UAE.

#### 4.3.2.1 Synthesis on Lessons Learned and best practices

In relation to parameters for identified in the literature review, the answers provided by the interviewees are far-fetched. To reinforce these deduction, three interviewees also made reference to this statement. First Interviewee B1 mentioned that lessons are not learned is activating the command system and training them in case of disasters or crisis or any emergency. Interviewee B3 stated that lessons are not learned, there should be a team for search and rescue in other emirates, not just in Abu Dhabi so that pressure can be reduced on the Abu Dhabi team to get quicker response. Lastly Interviewee C6 mentioned that there is no data or statistics archive on lessons, so that they are not learned. A further analysis of the overall data generated from this interview session indicated the main point that lessons are not learned, nor are mechanisms in place to ensure that lessons identified are learned and used, this is shown in Figure 4.9.



**Figure 4.9 Text search query for evidence of lack of lessons learned**

The analysis in Figure 4.9 indicates that strong recommendations are also needed in this area to ensure that lessons are being learned going forward in planning for ME in the

UAE. However, it is possible that challenges and barriers exist in the current arrangements to prevent mechanisms for learning lessons and using them for planning for future ME. This awareness makes the explanations and analysis for the next section important, which is also key components of the third objectives.

### 4.3.3 Challenges and Barriers

This section addresses data on challenges for dealing with ME and barriers to improving arrangements for dealing with future ME. The interviewees were asked to explained the challenges that their organisation has faced during operation and planning for major emergencies. They were also asked to explain the barriers that may hinder the effective planning for ME. Majority of the interviewees highlighted certain key challenges and barriers.

The challenges mostly identified are: “*Communication, Lack of knowledge and experience, Natural factors, Lack of equipment and resources, Planning, Lack of information, Coordination, Training, Lack of public awareness, and Legislations*”. Barriers highlighted are: “*effective planning for major emergencies faced by practitioners and planners*”. In contrast, only one interviewee stated that there are no barriers. Figure 4.10 shows NVivo screen shot of tree nodes for challenges and barriers.

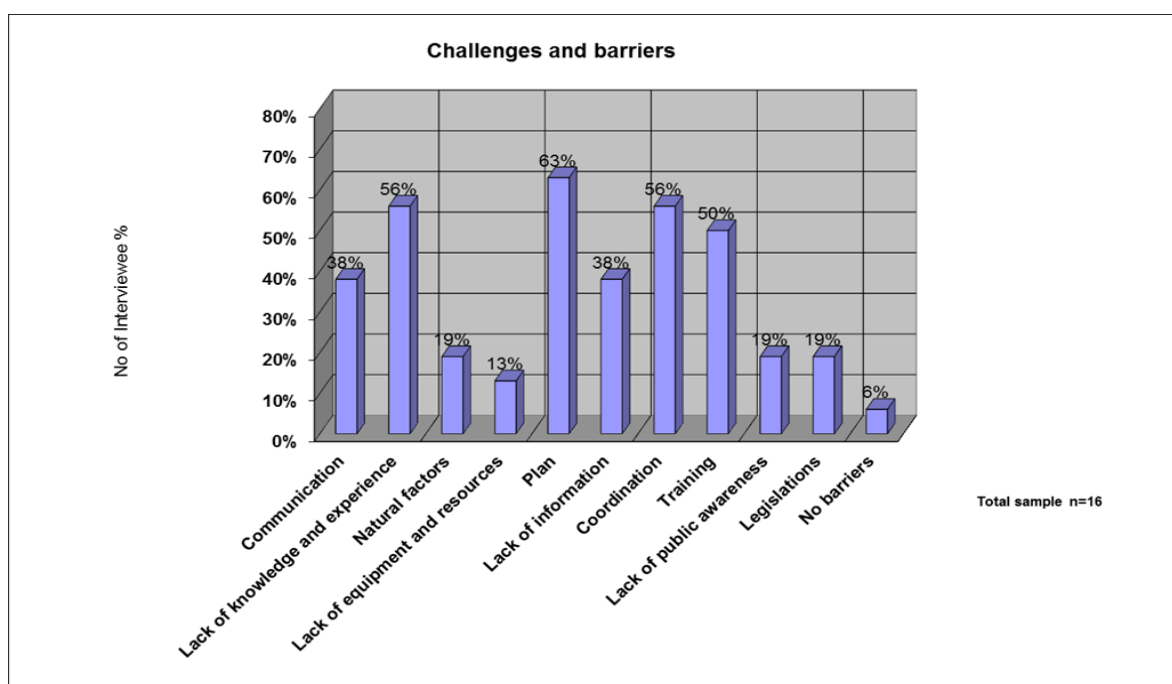


Figure 4.10 The challenges and barriers faced planning for ME

As indicated in Figure 4.10, communication, is believed by six of the participants to be one of the most important challenges. In this matter, interviewee A3 explains that the impact of weak communication is devastating and because of lack of technical know-how of its usage response process may become more complicated. Interviewee B2 talked about importance of communication and provide example of that: *“The communication is very important in most of incident, the staffs were using their own personal mobile phones. In some areas, the signal is very bad and weak, so this affects response and communication. Barriers – communication should be directed to the unit responsible for response, not to individuals on their mobile phones.”*

While communication problem was emphasised by A3, it can be noticed from Figure 4.10 that plan, coordination, training and lack of knowledge and experience are all highly rated challenges which interviewees considered as barriers to improving planning for future ME. Considering “lack of knowledge and experience”, majority of interviewees highlighted this specific point. Interviewee C1 mentioned that factors responsible for challenges and barriers are ‘Lack of familiarity of duties’ for multi-agency response, ‘Procedures and practices’ among emergency agencies, and ‘experience problems’ because of lack of a fixed rule to unite work between emergency agencies. He adds that, *“there are plans and knowledge at the moment to deal with a disease such as H1N1”*.

Another factor mentioned by interviewee (C1) is that, there is *“lack of qualified human resource in civil authorities”*. Even more, interviewee A1, interviewee A5, interviewee A3 and interviewee B3 have similar perspectives and mentioned this factor amongst other factors as the challenges and barriers that their organisations have faced when planning for ME. Interviewee B3 explained how they overcome and avoid this challenge by increasing training with human resources. Interviewee A5 stated that *“lack of knowledge and experience because there are no many incident or major disaster happening in UAE, like big cyclone”*. In terms of Natural Factors, only cited this factor as challenges or barriers.

In this respect, interviewee A3 mentioned it amongst other challenges and his views agree with interviewee B5, he further specified that: *“Other factors cause problems like - Natural factors, like fog, cloud, mountains”*. In the same manner, the above two

respondents A3 and B5, stated that ‘lack of equipment’ and ‘resources’ are one of the challenges to effective planning for ME faced by practitioners and planners. They explained that “lack of equipment and resources” include; staffs, vehicles and limited bed for victims of burns, because not all hospitals accept victims of burns (B5), who adds that it is difficult to know the resources from other organisation and determine if the resources are sufficient to help with response.

The challenges which were considered by majority of the respondents, is the planning process. In relation to this, one of interviewees explained that, “there is no joint document for procedures to plan and develop for all emergency agencies to plan together – or for multiagency planning” (Interviewee C1). Interviewee C2 considers this as due to that lack of experience of staff in planning by saying: “...*Lack of familiarity of staffs in operation planning or when developing plans. Lack of expertise or experience for strategic planning.*”. Interviewee C4 as well talked about activating plans in training “*Repeating the weakness point to activate plans in training or the real situation and without taking into consideration to resolve it.*”

Moreover, another interviewee suggests that one department should be specialized in plan making and development and then the department should share all necessary information with other departments and agencies (Interviewee A4). Interviewee B5 states that there is no standard or framework that is unified for response for all partners in case of planning for disaster. Even more, interviewee A3 said that the problem in planning is because of delay to deliver full plans from the partners. According to him, “*There is delay to provide detailed plans from the partners. Delay for making the meetings with the partners and that slows down the speed of preparing the plan*”.

Lack of information is also one of the most important challenges and barriers that UAE organizations have faced when planning for ME. In this esteem, six of interviewees mentioned lack of information as one of the greatest challenges and barriers that UAE organizations faced when planning for ME. Furthermore, interviewee C6 specified that it is as a result of nonexistence of databases for disasters. Also, interviewee B5 that they “*don’t have the right information, data or statistics*”.

Interviewee B1 gave some examples from his experience about the difficulty faced such as lack of information: “...the difficulty of evacuating people, especially squatter settlement by workers in the area. A bailout, having difficulty in unlicensed places of residence and the number of people over space. Not to give accurate information on the location and type of incident. Cause away areas for fire stations to slow down the response process”. He adds “Difficult to predict disasters and events, but got taken as examples for other countries”. According to nine of interviewees, coordination is considered as one of the most significant challenges that organization have faced when planning for major emergencies.

In this circumstance, interviewee A2 mentioned that they “*didn’t share and work together*” as well as “*lack of communication and coordination between the departments*”. Even more, interviewee B2 points out that they have been working without coordination between all agencies involved in incidents: “*There were no control or command in the site and we were working without coordination between all agencies and this made messy area. We should activate the command and control system.*” He adds that in their organization they mostly face change of coordinator “*change the coordinator from the other partners such as Red Crescent*”.

Furthermore, interviewee B3 declare that there is no coordination between the main centre in Abu Dhabi that contains all rescue equipment and any incident location because of long distance; “...there is far distance between the incident location and the coordination centre in Abu Dhabi (where we provide all rescue equipment), so there is need to make another search and rescue team in area closer to high risk. Other barriers include difficulty to deal with the public in evacuation”.

In terms of training, half of respondents refer to this challenge that they faced in the time of incidents or when planning for ME and they declared some important trainings were required. In this respect, interviewee C5 mentioned that this training as one of the challenges experienced amongst others, he detailed: “*Yes- there are challenges, lack of knowledge and experience of emergency management and was lack of training and it was not very clear to use the command and control system*”. Interviewee A4 explained the linked between planning and training. Furthermore, he stated they should do the training

to see if the plan is effective or not. Interviewee A2 pointed out that the training in risk management is essential.

Interviewee B2 specified that the training is needed, and insisted that training in fog incidents is crucial for all involved staff: *“I hope there is training especially for the fog incident which involves all the emergency agencies, because I never heard any training happening especially for the fog.”* Moreover, the participant in interviews B3 emphasised this point by stating that there is limitation in training in specific area. He affirmed; *“...the training that most rescue team have is also limited to specific incident and not general to all hazards and incident management.”*

Three of interviewees mentioned that *“lack of public awareness as a challenge”*. Interviewee C6 highlighted that *“the factors that caused problems – “community didn’t respond to the awareness and warning for the risk.”*. In this context, interviewee B3 indicated that *“...there is lack of public awareness about levels and potential impacts of threats and risk. There is lack of involvement or engagement from the media. And it makes it very difficult to evacuate people”*.

Moreover, three of respondents revealed that legislations are one of the main challenges and barriers that UAE organizations have faced when planning for ME. In this context, interviewee C5 stated: *“It is very important to have emergency management legislation; however, we have it now and was established in 2011 which covered all the site and aspects of response.”* Even more, Interviewee C6 mentioned that they need the laws that hold people accountable for violating warning and awareness instructions.

#### **4.3.3.1 Synthesis on Challenges and Barriers**

The results for challenges and barriers shown that several challenges abound in the UAE in all the organisations represented in this research. It can be concluded that UAE experts have a very wide range of factors considered as challenges for dealing with any form of emergency, but not necessary with ME. This may be due to the long service years dealing with different issues in the country. Challenges identified include lack of framework and practices, although the literature review has established that response framework exists which was also confirmed by C6 in the results for explanations of CP.



Other challenges include environmental and location problem, bad practices, lack of training and knowledge procedure problem and communication problems. However, it is noticed that challenges identified relates more to the organisations responsible for response, resources, knowledge level, coordination, control and command, lack of awareness, limited and insufficient trainings to mention a few, all relate to organisation capability and not to management of ME as identified in the literature review.

However, factors identified by the respondents do not relate to challenges atypical to managing ME such as location, nature and scope and time the incident occur which were identified in the literature review. This further emphasises the limited understanding of concepts of ME and CP as identified in results for explanations on ME and CP. On the other hand, barriers identified relates to lack of experience in dealing with ME and on emergency management issues, plans and planning arrangement. Answers provided relate to secondary barriers identified in the literature review, suggesting that primary barriers are lacking since these relates more to lessons learned. Results for definition of CP and current practices and arrangements have already exposed that elements, mechanisms and understanding of and application of lessons learned are lacking in the UAE emergency management system.

In relation to barriers, the finding exposes that some of the barriers were also mentioned before but as challenges. These barriers encompass Lack of awareness and knowledge; Lack of planners' experience; Weak communication channels with other organisations for the purpose of coordination; No standard or framework that is unified for response for all partners in case of planning for disaster; Lack of legislation and the laws of emergency management and response team; Lack of database for disaster; lack of training; Lack of communication and coordination; lack of information that relate to impossible disaster; Lack of familiarity of staffs in operation planning or developing plans.

These barriers relate to what is classified in the literature review as secondary barriers which are not directly as a result of dealing with ME, but significant enough to hinder ability to improve arrangements for dealing with ME. The respondents also claim that, in their views no documents or lessons learn form a significant barrier to planning towards ME. Also, the findings reveal that the lack of experience in managing ME is a barrier to planning, while some respondents thought that both frequent change in personnel and lack of training and exercise are strong barriers to planning for MEs.

#### 4.3.4 Drivers for Managing ME

This section presents data and results for drivers for dealing with ME. The interviewees were asked to state or explain the factors/drivers that contribute to effective management of major emergencies. This also include explaining the factors that they think can make planning for any ME more effective. Most of the interviewees listed several points as a key driver that contribute to effective management of ME, and that they can make planning for any ME more effective. These points include Coordination, Training, knowledge and information, plan, Simulation, Resources, Experience, and Communication and leadership in Figure 4.11.

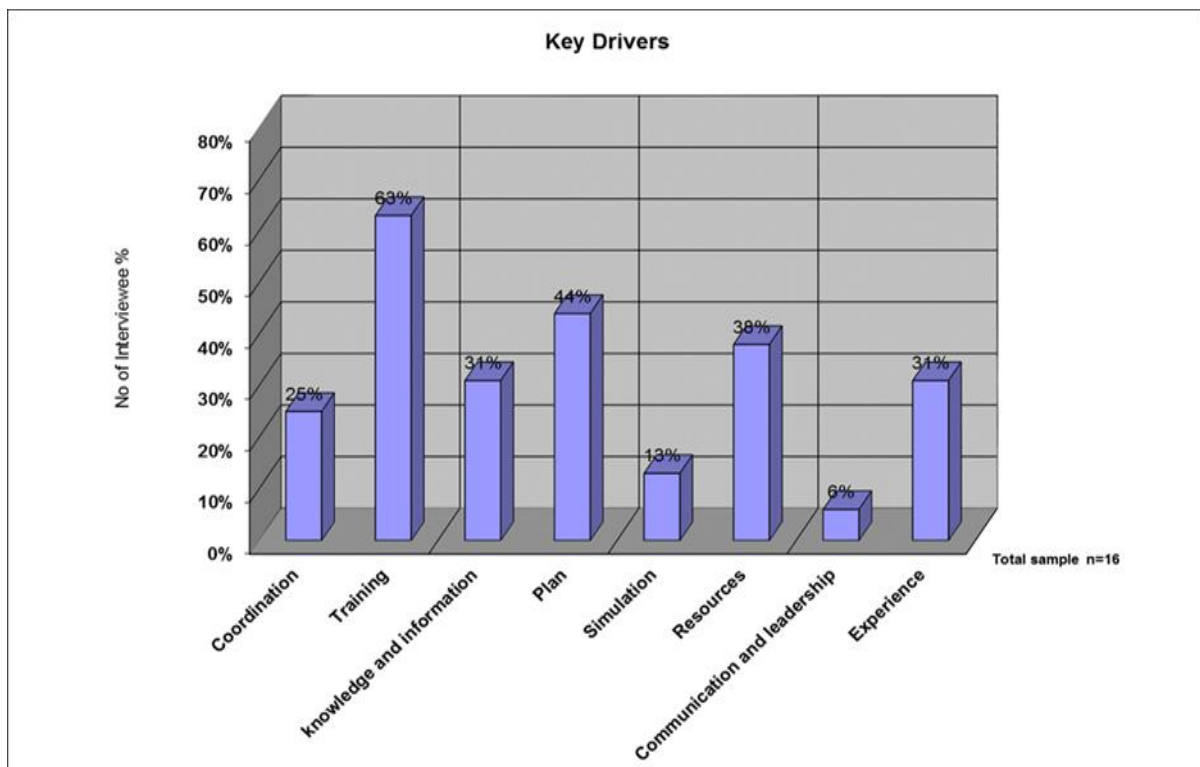


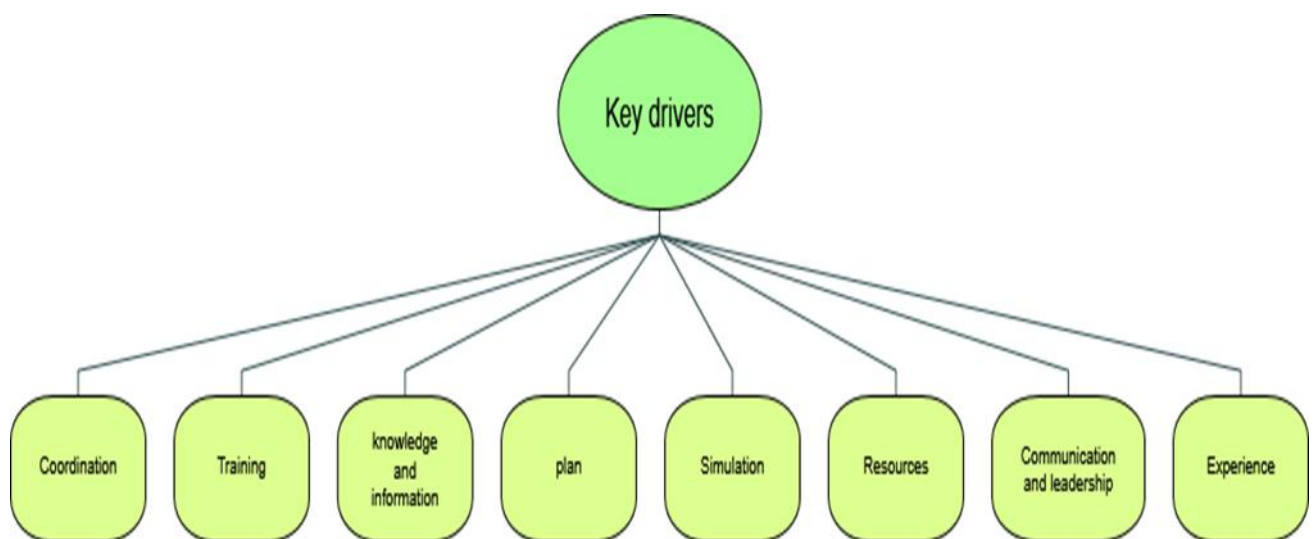
Figure 4.11 The drivers that contribute to effective management of ME

It can be seen in Figure 4.11 that majority of interviewees declared that training is one of the drivers that can make planning for any ME more effective. In this context, interviewee A4 talked about the importance of regular training and that should be for all the staff: *“Regular training for the force and test the plans. Must rotate training attendance of officers and ensure that all officers have equal opportunity to attend trainings”*. Interviewee B2 stated: *“Do training for all plans we have and plans should be easy to use*

by all agencies”. Interviewee C4 further mentioned that there is need to involve experienced partners in training and events.

In terms of coordination, four of respondents stated that it is one of drivers that can make planning for any major emergency more effective. Five respondents consider knowledge and information is one of drivers, in this issues interviewee A5 stated that the key driver is: “...to provide accuracy of information and seriously and readiness government agencies within their duty and roles in the event.”. Interviewee C2 has the same approach as he stated “Knowledge and experience for the planners, availability of studies and research in crisis areas.”. In the same theme, C3 has the same point of view as he sees the key driver as “Availability of information and statistical data, availability of command and control system to manage events.”

In terms of plan, seven respondents mentioned it as one of the most important key drivers that contribute to effective management of ME and make planning for any ME more effective. Interviewee B1 suggests that that the key drivers are continuous updating of the plans in line with the current of events. From C4 point of view, he: “Put standards to evaluate the level of effectiveness of the plan and to have constant scrutiny to develop the effective functioning of plans.” However, Figure 4.12 further emphasise the factors discussed by the interviewees as key drivers for improving response to ME.



**Figure 4.12 Nvivo emphasised factors that serve as drivers for managing ME**

Figure 4.12 shows the themes emphasised as Key drivers using Nvivo software. One of interviewees mentioned that *“coordination with all partners i.e. security partners or civilians is important for better management of ME”* (interviewee B2). Two of interviewees (B1 and B2) mentioned simulation theme amongst other key drivers, as interviewee B1 stated that *“Continuity phantom field exercises that simulate unexpected events. The existence of alternative plans in the civil defence ensure business continuity”*, and B2 stated *“put scenarios and trainings which can simulate many but different types of disasters”*.

In term of Resources, six respondents mentioned it as a key driver. Interviewee B3 and interviewee B5 from practitioner have the same attitude, as B3 specified that required resources for each organization, according to their specialization, and interviewee B5 sees that *“all data from organization should be clear in terms of resources they are capable of providing, especially in the specialized organizations”*.

In the same context, interviewee C3 points out that *“availability of resources should be in line with the size of the risk which have been identified and assessed”*. During the interview sessions, only one interviewee (C6) mentioned that *Communication and leadership is a key driver that contribute to effective management of major emergencies, and that can make planning for any major emergency more effective*. However, experience was considered by five participants, as one of the key drivers. In this matter, respondent C3 sees that it is important to *“refine experience by doing specialized courses and to travel abroad to get additional experience”*.

Moreover, respondent A1 indicated that: *“...formation of specialized team and they have enough experience for planning. And make comparison and studies with countries which have experienced extreme disasters before. Help from expert people from other countries.* Data on drivers have indicated that interviewees are cautious of the need to improve arrangements for dealing with ME. Whether these key drivers are sufficient for improving response to ME and its management in UAE remains unknown, but the results are analysed next.

#### **4.3.4.1 Synthesis on Drivers for managing MEs**

The key drivers identified by the interviewees are good and shows that most of the interviewees understand the need to improve on the current arrangements and practices for dealing with ME as earlier identified. However, the key drivers lack elements of contingency planning or factors outlined in table 2.7, but step 3 in the table seems to have been identified in the results for challenges and barriers. Despite this, the finding identified certain factors as necessary drivers for improving the current practices based on the challenges experienced in the UAE.

The drivers identified were training, effective easy and clear procedure, coordination, knowledge and formation, suitable plan and updates of plans, communication and leadership, available resources for agencies and experiences. While these key drivers are not wrong and are required as identified by the interviewees, they do not quite align with the requirements for CP which may translate to effective management of ME. Thus, there is need for effective CP process that maximize the acknowledgement of these drivers, but to integrate them with elements of CP and drivers outlined in Table 2.7 in order for better response to future ME to be possible.

#### **4.4 Questionnaire Data and Analysis Requirements**

This section explains the analysis techniques and interpretation of the quantitative data obtained from the questionnaire as part of this research study. As discussed in chapter three, 90 questionnaires were distributed in three organisations that are legally responsible for planning and responding to crisis, emergency and disaster in the UAE; namely: Civil Defence, ADP and NCEMA.

However, 60 questionnaires were returned. As such, a response rate of 66.7% was achieved. Therefore, the target number of participants recruited from these organisations was sixty participants. The questionnaire analysis aims to further confirm and review any pending issues on the current practice of the past major emergencies in the country, lessons learned, challenges, barriers and drivers. In order to reduce and condense the large data produced from questionnaire the researcher resorted to use the Factor Analysis technique, which includes Bartlett test and reliability analysis.

#### 4.4.1 Bartlett test and Reliability Analysis

Bartlett's Test of Sphericity reached statistical significance ( $P < 0.001$ ), supporting the factorability of the correlation matrix, which means that the variables are correlated to some extent, and therefore factor analysis is appropriate. An identity matrix is matrix in which all of the diagonal elements are 1 and all off diagonal elements are 0. It is require rejecting this null hypothesis. For factor analysis to work it needs some relationships between variables. Therefore, the Bartlett's test must be *significant* (significance value less than .05). The significant test expresses that the  $R$ -matrix is not an identity matrix, therefore, there are some relationships between the variables expected to be included in the analysis. However, for these data, Bartlett's test is highly significant ( $p < .001$ ), supporting the factorability of the correlation matrix, which means that the variables are correlated to some extent, and therefore factor analysis is appropriate as shown in Table 4.3.

**Table 4.3 KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.615
	Approx. Chi-Square	370.333
Bartlett's Test of Sphericity	df	153
	Sig.	.000

As seen in Table 4.3, where df is a degree of freedom and sig. mean significance value. Reliability Analysis measures the overall consistency of the items that are used to define a scale. Model- Alpha (Cronbach) is a popular method to measure the reliability of the items in the questionnaire. The coefficient of reliability ranges from zero to 1.0 in providing this overall assessment of a measure's reliability. Although the standards for what makes a "good" coefficient are entirely arbitrary, many methodologists recommend a minimum coefficient between 0.65 and 0.8 and coefficients that are less than 0.5 are usually unacceptable. Cronbach's alpha was computed and as a result, a number of items and reliability coefficients were produced.

**Table 4.4 Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.720	.739	19

The computation of Cronbach ( $\alpha = 0.787$ ) in Table 4.4 indicates the overall reliability of the questionnaire. This suggests that all of the items are reliable and the entire test is internally consistent. Therefore, all item scales can be used for further analysis. These explanations introduce the data analysis presented in the next section and the rationale for results generated.

#### **4.5 Factor Analysis Results**

The Factor analysis begins by producing a symmetrical square matrix, known as the correlation matrix. To decide how many factors need extracting by the means of Kaiser's criterion, we can use either latent roots or Eigen values, plus the Scree test criteria. In our study, components with an Eigen value of 1 or more were considered significant whilst those below 1 were ignored. In this study, only those components carrying an Eigen value of 1 or more were regarded as significant, and all those below were ignored. Information on the number of factors to extract can be obtained when the Total Variance Explained box is examined. Those columns under Extraction Sums of Squared Loading show what SPSS has selected.

**Table 4.5 Total Variance Explained**

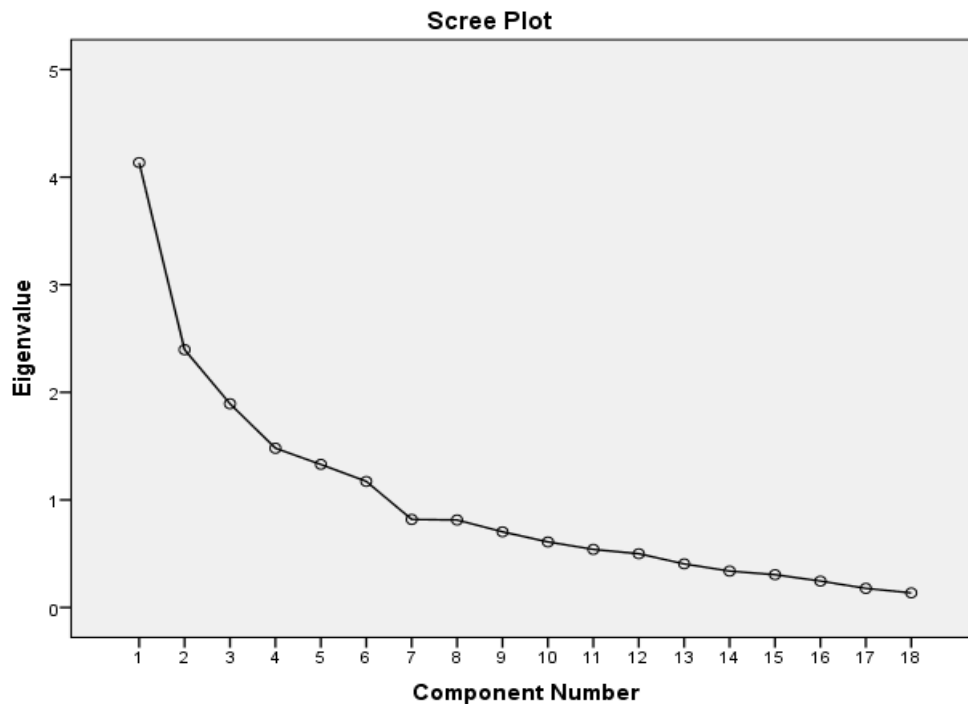
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings <sup>a</sup>
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	4.135	22.971	22.971	4.135	22.971	22.971	3.300
2	2.396	13.313	36.283	2.396	13.313	36.283	2.441
3	1.894	10.520	46.804	1.894	10.520	46.804	2.208
4	1.480	8.224	55.028	1.480	8.224	55.028	2.329
5	1.330	7.391	62.419	1.330	7.391	62.419	1.501
6	1.172	6.511	68.930	1.172	6.511	68.930	1.998
7	.819	4.550	73.480				
8	.813	4.518	77.998				
9	.703	3.908	81.906				
10	.610	3.386	85.292				
11	.540	3.001	88.293				
12	.500	2.777	91.070				
13	.405	2.252	93.323				
14	.338	1.879	95.202				
15	.305	1.693	96.894				
16	.246	1.365	98.260				
17	.178	.987	99.247				
18	.136	.753	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

After all questionnaire, had been entered, in Table 4.5, it can be seen that the only first six factors have an Eigen value over 1. Therefore, SPSS is suggesting we extract those factors that account for 68.93 per cent of the variance of the relationship between variables. Furthermore, another way to determine factors is by using a Scree plot (See fig 4.13.). Before the amount of unique variance begins to dominate the common variance structure, we use the Scree test to identify the optimum number of factors we can extract. We obtain the Scree test by plotting the Eigen values against the number of factors in their order of extraction, and the profile of the generated curve is used to evaluate the cut-off point.





**Figure 4.13 Scree plot for qualitative data**

From Figure 4.13, we can see that there is a decreasing curve to the graph, the Eigen value being highest for the first factor and decreasing for the subsequent factors. The highest Eigen value accounts for the most variance in the data, whilst the subsequent factors account for a continually reducing variance. The direction of the slope changes after the fourth component, illustrated by an elbow shape progression of the slope, which then drops after the sixth component and continues as a stable plateau where each subsequent factor shows very small variance. Here, we need to keep in mind that we are using Factor analysis to reduce the large number of variables to arrive at a smaller number of interpretable factors that explain the maximum amount of variability in the data.

The total amount of variability of the original variables explained by each factor solution is another important metric to keep in mind. It is presume that the first four factors (22.971, 13.313, 10.520, and 8.224) are a good, simpler substitute for all the variables, as together they explain most of the variability in the original variables. This also ensures us that all other variables can be dropped without losing much of the original variability.

It is also important to bear in mind that each of the identified factors should have at least three variables with high factor loadings (see Table 4.6: Component Matrix).

**Table 4.6 Component of Matrix**

	Component					
	1	2	3	4	5	6
Is there any contingency plan or planning used to plan and respond to major emergencies?	.166	.562	.531	-.242	.262	.093
Have you heard about contingency planning before?	.048	.186	.240	.339	.538	.276
Lack of experts who can lead response	.696	-.178	-.072	-.216	-.206	.454
Lack of contingency planning	.652	-.314	-.038	-.322	.093	.276
Lack of experience managing major emergencies	.617	-.331	.141	.378	.199	-.048
Lack of training and exercise to prepare for major emergencies	.735	-.156	.092	-.273	.160	-.101
Lack of contingency plan as guidelines for preparing for major emergencies	.558	-.062	-.078	-.070	-.352	.299
Too difficult to manage during response	.574	.010	-.133	-.141	-.347	-.248
No documents or lessons to learn from	.502	-.216	.317	.217	.016	-.312
Frequent change of personnel	.232	-.523	.053	.546	.278	.130
Good information and communication about major emergencies during response	.607	.348	-.196	.159	.047	-.317
Learning lessons from past major emergencies in the UAE	.380	.648	-.377	.158	-.012	.171
Having many emergency organisations manage major emergencies	.225	.142	-.316	-.333	.548	.261
Routine preparedness training and exercise	.314	.560	-.513	.326	-.052	.004
New technology and resources for early warning system and response	.414	.393	.274	.463	-.308	.155
indicate how effective the contingency plan was for managing the major emergencies.	-.103	.650	.504	-.172	.015	-.010
Unforeseen or unpredictable	.291	.059	-.477	-.159	.367	-.477
Lack of resources	.632	.042	.540	-.174	-.021	-.280

Extraction Method: Principal Component Analysis.

a. 6 components extracted.

Following the recommendations of Comrey and Lee (1992) factor loadings higher than 0.45 and described as “fair” by these researchers, were included. The researcher chose only those factors with factor loadings of 0.45 or higher, based on the sample size and the criteria of the significance of factor loadings. For interpretation, we should concentrate upon the Pattern Matrix (Table 4.7).

**Table 4.7 Pattern Matrix**

	Component					
	1	2	3	4	5	6
Is there any contingency plan or planning used to plan and respond to major emergencies?			.856			
Have you heard about contingency planning before?				.496		
Lack of experts who can lead response	.928					
Lack of contingency planning	.782					
Lack of experience managing major emergencies				.734		
Lack of training and exercise to prepare for major emergencies	.510					
Lack of contingency plan as guidelines for preparing for major emergencies	.695					
Too difficult to manage during response						
No documents or lessons to learn from				.512		
Frequent change of personnel				.801		
Good information and communication about major emergencies during response		.547				
Learning lessons from past major emergencies in the UAE		.815				
Having many emergency organisations manage major emergencies					.701	
Routine preparedness training and exercise		.883				
New technology and resources for early warning system and response		.530				
Indicate how effective the contingency plan was for managing the major emergencies.			.776			
Unforeseen or unpredictable						-.816
Lack of resources			.598			

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 15 iterations.

Now by looking at the Pattern Matrix (table 4.7) the 6 columns refer to the loadings on each of the 6 factors. To define each factor, we decided to include those variables with salient loading on the factor (above 0.45). The interpretation and analysis of these findings are discussed in the next section to confirm or refute findings from the interview data findings and analysis. As mention above, that the main aims for use factor analysis is to condense the large quantity of variables to a small number of variables. Therefore, the main applications of factor analysis technique are first to *reduce* the number of variables

and secondly to *detect structure* in the relationships between variables, that is to *classify variables*. Therefore, factor analysis is applied as a data reduction or structure detection method.

#### **4.5.1 Questionnaire Data Analysis**

The data analysed generated the six broad factors which are explained and interpreted below;

**On factor 1 - challenges**, the following variables have the highest loading:

Lack of experts who can lead response;

Lack of contingency planning;

Lack of training and exercise to prepare for major emergencies;

Lack of contingency plan as guidelines for preparing for major emergencies;

As noticed from these variables, the main research themes are lacking in the UAE current practice and arrangements for dealing with ME. These contradicts the general consensus from the interviewees, but supports the assumptions made from case study evaluation and literature review. Since lack of contingency planning and experts who can lead response to ME are evident from the account provided by officers from wider scope of the three organisations, it can be assumed that training and exercise and other guidelines are absent and inadequate for responding to ME.

**On factor 2 - drivers**, the following variables have the highest loading:

Good information and communication about major emergencies during response

Learning lessons from past major emergencies in the UAE

Routine preparedness training and exercise

New technology and resources for early warning system and response

The variables generated for factor 2 has loaded and confusing interpretations. For example, factor 1 already exposed that “lack of training and exercise to prepare for ME” is evident in the system, but factor 2, third variable says “routine preparedness training and exercise” is present. This findings can either be interpreted as evidence of confusion in the system and need for better education and awareness about objectives for planning

for ME. However, identifying communication during response to ME and new technology and resources for early warning system and response are all variables that relate to response phase and not planning or preparedness phase. While these variables can be classified as good practice, they are not best practice for dealing with ME.

**On factor 3**, the variables with the highest loading are:

Planning used to plan and respond to major emergencies

Indicate how effective the contingency plan was for managing major emergencies.

Lack of resources

Factor 3 has fewer variables which shows that the evidence or emphasis on planning for and responding to ME is scanty in the three organisations examined. Perhaps this is due to the last variable which is “lack of resources”. But overall, the variables in factor 3 are vague and not affirmative on what the situation is about planning for and responding to ME.

**Factor 4 - barriers** variables have the highest loading:

No documents or lessons to learn from

Yet to hear about contingency planning before

Lack of experience managing major emergencies

Frequent change of personnel

The variables in Factor 4 further reveal lacks and problems that can be attributed as barriers to managing ME, ability to learn lessons and inability to have CP in place in the UAE. Frequent change of personnel, lack of knowledge of CP, no documents to refer to and lack of experience in dealing with ME are all factors that can hinder ability and building capacity for managing ME. Hence, variables from Factor 4 provide more clarity on challenges militating against having CP and learning lessons that can aid management of ME.

**The 5<sup>th</sup> and the 6<sup>th</sup> factors** each have less than three variables with high factor loadings which are why they were not included the results.

In summary, the variables in factor 1 all represent the challenges in responding to ME in the UAE, and hence could be labelled ‘*response challenges*’. In addition to this, the variables also reflect the state of current practices in the UAE, hence can also be labelled

as “*status of current practices for ME*”. The variables in factor 2 all represent how ME is managed in the UAE, and hence could be labelled ‘*best practice and current arrangements in UAE*’. In addition, the variables in factor 3 all represent lack of in-depth knowledge about the contingency planning, and hence could be labelled ‘*lack of knowledge or challenges for dealing with ME*’. Finally, the variables in factor 4 all represent the barriers for planning for ME in the UAE, and hence could be labelled ‘*barriers to improving arrangements for managing ME*’.

While the questionnaire data analysis has not revealed that the interview results are wrong, it has further clarified the vagueness of information provided by the interviewees. It is evident from the questionnaire analysis and findings that many are yet to hear of contingency planning and its true meaning as explored in this research. It is also clearer that current practices, though with some good practices, is characterised by challenges such as lack of knowledge, experts seasoned in dealing with ME and lack of documents from which lessons of past ME can be learned. Hence, challenges in dealing with ME abound and barriers to improving the current practices in UAE also exist, which further justify the importance and relevance of this research amidst continued occurrence of ME. To this end, the next section summarises the deduction of findings from both interview and questionnaire data results.

#### **4.6 Deduction from Primary Data Results**

The results derived from the primary data has provided more explanations and clarity for issues raised and gaps identified earlier in this research. As seen in this chapter, the themes investigated have not been explained as desired by the interviewees and questionnaire respondents. It however exposes the problems that exist in the system and specific areas that require improvement, areas which the research participants acknowledged also.

**Major Emergencies:** ME has not been explained as both a process and an event as identified from the case study evaluation. It has however been identified and explained as an event, an emergency that require the efforts of the more than one emergency organisation to respond to. While this is true, ME that have occurred in UAE have actually required the response efforts of more than three legislated organisations. Hence, it can be

deduced that there is need for more awareness and clarity on what constitute ME especially in relation to the way ME have been occurring in the UAE.

Inability to recognise the signs of ME or the trigger point makes it impossible for responding organisations to determine when response need to begin or to prevent its escalation. Further, evidence of confusion was detected in both interview and questionnaire data regarding this. For example, the factor analysis did not even load any relevant information on ME that relates to characteristics of ME. This indicate that confusion, and lack of understanding or knowledge exist regarding this issue, thus emphasising need for education and more awareness regarding ME.

**Contingency Planning:** results pertaining to this theme was probably most controversial as most of the interviewees A1, A2, A4, A5, B1, B3, C2, C3, and C4 all answered “yes” to the inquiry about whether CP exist in UAE or not. Answering “yes” without being able to back up the answer with solid explanations or related information to CP, indicate that a major confusion and misinformation exist regarding what constitute CP. While the case studies show that CP does not exist, the questionnaire data also confirmed this. It means that education regarding this is needed in order to ensure that improvement is possible. Otherwise, lack of knowledge and confusion such as this may serve as barrier to developing effective CP for dealing with ME.

**Current Practices and Arrangement:** from the results, it is evident some practices exist and that response phase tend to receive the most attention, development and focus. However, this is the phase where ME is already happening, without CP, any form of arrangement makes all the equipment and training of organisations to merely react less effective. Due to lack of CP, responding to ME and not just emergency which was explained by interviewees A3, B6 and C3 can be challenging due to its characteristics to quickly escalate and the magnitude in which they may occur.

Despite this gap, it is commendable that early warning system, routine preparedness training and exercise and new technology and resources (variables identified in Factor 2) are put in place for dealing with any form of emergency. But it seems the response phase is disconnected from the preparedness phase where necessary steps out to be taken for contingency planning. This exposes another specific area where improvement or

recommendations is needed. There is need to overlap the preparedness/planning phase with response phase by focusing on the steps for contingency planning (UNHCR, 2011) and effective CP (Figure 2.3).

**Best Practice and Lessons Learned:** the best practice evident in the UAE system was identified through the questionnaire data analysis since the interviewees mentioned several practices that were hardly repeated by other interviewees. The best practices are early warning system, routine preparedness training and exercise and new technology and resources (variables identified in Factor 2). Practices like having different types of plans, risk assessment, readiness of national operation centre, staff communication and agreement with partners, smart maps and training (Interviewees A1, A5, B1, B2, C2, C3)

It is also commendable that the three organisations have people who are informed about practices for responding to and planning for emergencies, and the need for improvement. However, it is evident that the practice does not include any mechanisms for learning lessons or for using lessons learned from past ME to improve planning for future ones. It was identified within variables for Factor 4 that documents on past lessons are lacking or there are no lessons to learn. Another variable in this factor also indicated that they are yet to hear of CP. Hence, this gap influences a recommendation that focuses on encouraging the three organisations (ADP, CD, and NCEMA) to create mechanisms suitable for their organisation for lessons learned and utilising lessons to influence planning for future ME.

**Challenges, Drivers and Barriers:** regarding these themes, some challenges and barriers like communication, lack of knowledge and experience, natural factors, and other shown in Figure 4.10. While these factors may be peculiar to the UAE environment, they are not specific to challenges that relate to dealing with ME. This mix-up further confirms the limited understanding of ME, CP and challenges associated with it. However, the barriers identified, which is also the same as the challenges are similar to secondary barriers identified in the literature review. On this issue, or themes, nothing distinct besides lack of resources was identified from the questionnaire analysis.

Hence, the sparse information on these themes emphasise the need for guidelines that strategically address challenges relating to managing ME, barriers that may hinder



improvement measures and drivers that enhance commitment to effective CP and management of ME in UAE. Despite the sparse information on these themes, the interviewee participants expressly specified areas they consider necessary for improving the system or for any recommendations for the UAE emergency management sector.

4.6.1 Areas of Improvement

This question was asked to identify areas specific to the UAE environment and response organisations in order to determine acceptable area that the guidelines to be developed based on the outcomes of this result. The research respondents were asked to explain areas of improvement in the response agencies. Majority of the interviewees itemized many areas that need to be improved in the core emergencies response agencies. But comments span across planning and performance for response across all levels of response i.e. Gold, Silver Bronze for events that can escalate.

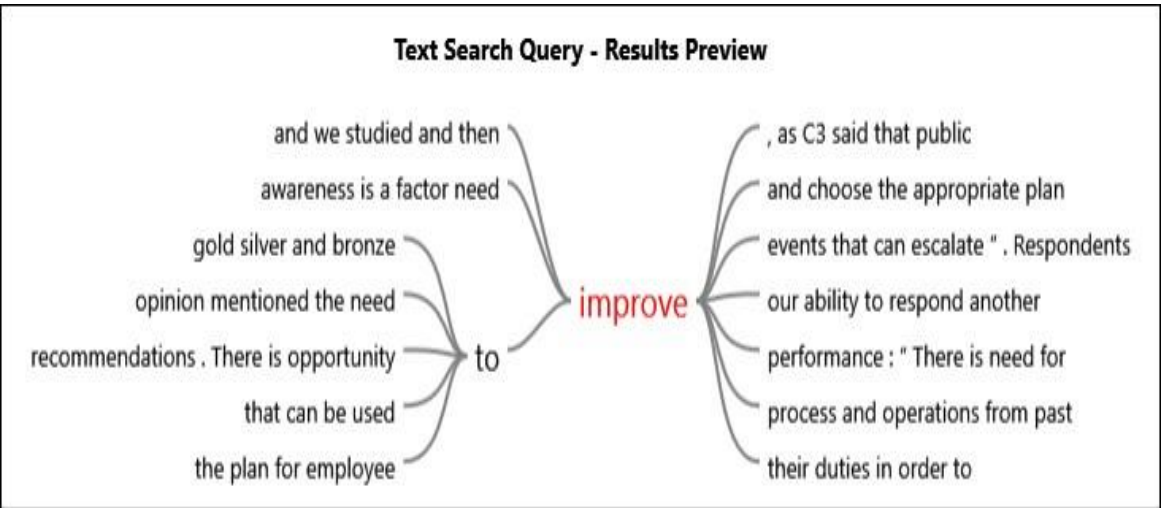
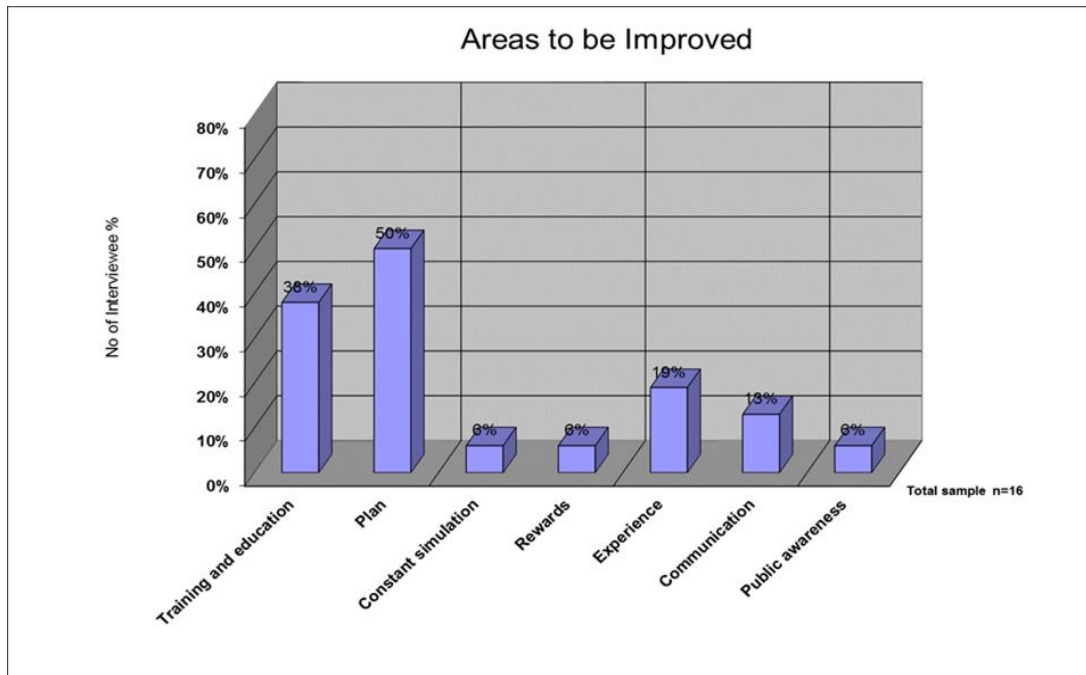


Figure 4.14 The areas of improvement in current practices

In addition to the range of answers shown in Figure 4.14, specific means through which the improvement should be made are; training and education, plan, constant simulation, rewards, experience, communication, and public awareness shown in Figure 4.15.



**Figure 4.15 Areas of improvement in the core emergency response agencies**

As noticed in Figure 4.15, majority of respondents (50%, 8Nr) mentioned that plan is most significant area that needs to be improved in all the three organisations. However, since several plans already exist, the guidelines will focus on encouraging a culture of planning process that links activities and measures taken in the preparedness phase with response phase. Above all, the results reveal that many areas need to be improved in the UAE current practice.

However, responses that emerged from this section emphasize processes that demonstrate a weak link between documentation of plans or even having plans and the implementation of these plans in terms of procedures and response arrangement to ME. The gaps identified in this section on current practice encourage the importance of identifying challenges and drivers in the current practice. This is essential, so that drivers in the current practice can be used as basis for mitigating the impacts of challenges for a more effective practice. The drivers identified may also motivate the process for enhancing knowledge of CP and using experiences from past incidents in the most effective manner for planning for future ME.

#### **4.7 Summary of Chapter Four**

This chapter has presented the findings that have emerged from qualitative results (semi-structured interviews) and quantitative results (questionnaire). These multiple sources of evidence while providing valuable in-depth information on the issues enabled investigation and evaluation of best practices from past ME in the UAE with the intention of develop guidelines and recommendations for UAE governing authorities. The intentions of this is to ensure that future ME are effectively managed through contingency planning. Sections in this chapter has helped to identify number of variables (through questionnaire analysis) and explanations (through interview analysis) that are pivotal in developing guidelines for improvement in the UAE. As a result of findings in this chapter, the next chapter focuses on discussing the research results by linking the discussion with the literature review and case study evaluation chapter. Through this process, the variables that inform the guidelines become more pronounced and the suitability of the guidelines for the UAE context is discussed and assessed in subsequent chapter.

## **CHAPTER 5: Discussions of Results and Guidelines**

### **5.1 Introduction**

The aim of this chapter is to discuss the research results. The discussion in this chapter include the findings from the previous chapter and deductions made from chapters two and three. The proposed guidelines for dealing with ME is also developed and assessed in this chapter. Thus, sections in this chapter summarise and discuss findings for each objective and research question. Section 5.3 derives information from each finding to determine content of the guidelines proffer as recommendations for improving current practice in the UAE for managing ME. Section 5.4 assesses the guidelines, while section 5.5 examine the suitability of the guidelines for the UAE emergency management arrangements. Sections after these summarise the discussions of key issues, and explain the relevance of research results to research scope and rationale for conducting this study.

### **5.2 Research Findings**

This study has evolved from the first chapter to this chapter which focuses on discussing the main research results in relation to the concepts examined and discussed in chapter two. This chapter was key in identifying gaps which were further investigated through primary data collection and analysis, by which further clarity were provided by the research participants. The research themes derived from concepts critiqued and examined in chapter two for example, were significant in determining the epistemology and verifying information provided by the participants. Although the participants are experts in their own right, it is obvious from the research findings that, there is gross confusion and limited understanding on what constitute Major Emergencies (ME) and Contingency Planning (CP).

Thus, without the background provided in chapter two, it would have been impossible to achieve the aim of this study. The literature review provided strong context from both existing research in this field and documented information on practice of emergency management, CP and management of ME. This justifies the literature review as valid foundation to base the discussion of result in this chapter. Therefore, this section uses each objective to discuss findings relating to each from the primary data analysis, but by

triangulating the results with findings from the literature review chapter and other references or theories that may support or refute the results.

### **5.2.1 Definition of Major Emergencies and Contingency Planning**

There are two themes in this section, namely; Major Emergencies (ME) and Contingency planning (CP). These themes relate to the first objective which sought “*to define ME and CP from literature and UAE context*”.

The explanations in section 2.2 aided the understanding of ME and clarified that it can be the “onset of an overwhelming event” (Mitroff, 2004) or an emergency that escalates following different stages that may provide opportunity for its escalation to be prevented (Turner and Pidgeon, 1997). This understanding or description became the working guide for the research investigation process, knowing that several emergencies may occur on a large scale, but without tendency to escalate beyond its onset. Evaluating the case studies of ME in different countries, UAE inclusive, helped to identify the “escalation” and “overwhelming onset” characteristics as main features consistent with most ME evaluated.

With this understanding, the description of ME centred in this understanding, which unfortunately was lacking in the UAE. All data collected through the interview and questionnaire indicated that understanding and knowledge of ME is lacking. Rather than explain ME, respondents like interviewees A3, B6 and C3 confidently explained the definition of emergency, but acknowledged that no definition for ME exists in the UAE. To this end, it is recommended that, as a starting point that ME is explained to all responding organisations in order to be able to identify trigger points and nature of response required for dealing with ME. Clarifying the difference is also necessary so that response procedure for emergency is not confused for response arrangements for ME.

Similar to the findings on ME is that of CP. Although most of the interviewees claimed that CP exists in the current practice, case study evaluation has demonstrated that CP is lacking in the system. In addition to this, section 2.4 which examined current practices in the UAE did not identify any preparedness arrangement beyond plan development and training activities to prepare responders for response. In the account provided by interviewees A3, B6 and C3 who are Gold level officers experienced and informed about

current practices, they also confirmed that CP is not part of the current practice, but may be soon. The explanations provided by the interviewees who claim CP exist indicate that they are uninformed on CP and that CP is not a plan.

To this end, education and training of personnel on ME and CP is needed as soon as possible. Clarifying the difference between ME and routine emergency is important for effective response, and clarifying what constitute CP is the first step towards having an arrangement that aligns with CP requirements. Education and training of personnel is recommended, because they have been examined by Alexander (2002; 2005) as efficient tool for creating awareness of emergency management procedures. Hence, this conclusion is taken from this existing knowledge in emergency management by Alexander (2002; 2005) to better educate the officers in Abu Dhabi Police (ADP), Civil Defence (CD) and National Emergency Crisis and Disaster Management Authority (NCEMA). Eventually, the improvement on these themes will lead to improvement of current practices and arrangement for emergency response in the UAE

### **5.2.2 Current Practices and Arrangements in UAE**

There is one theme; current practices and arrangements in the UAE, to discuss in this section. This theme relates to the second objective which is to “*examine current practices and arrangements in UAE government authorities for dealing with ME*”.

Global practices in emergency management is based and coordinated using the four phases of emergency management. While the terms used for each phase may differ due to impacts and nature of incidents the location is prone to, their activities are similar (outlined in Table 2.2). Similar arrangement and activities exist in the UAE for managing crisis, emergency and disaster (outlined in Table 2.3). Section 2.4 shows that UAE has structured arrangements and current practices appear sufficient for managing routine emergencies. However, case studies of ME evaluated in chapter two and justification for conducting this study indicate that the current practices and arrangement is able to effectively manage and mitigate the impacts of ME in UAE.

Although the primary data results did not dispute this deduction, they acknowledged that improvement is required in certain areas. However, it needs to state that acknowledgements of “need for improvement” was just 6% more than the percentage that

claim that the current practices and arrangement is “sufficient”. This means that among the interviewees, many are misinformed or unaware of the improvement that is needed to be able to effectively manage future ME. Mindsets based on erroneous information regarding ME and CP need to be corrected. Hence, the limited understanding of ME and CP and lack of mechanisms for lessons learned, it is evident from the research results that current practices and arrangements in the UAE is insufficient for managing ME and hence, need to improve appropriately to cover the demands of ME and its characteristics.

### **5.2.3 Best Practices and Lessons Learned**

There are two themes in this section; ‘best practice(s)’ and ‘lessons learned’. These themes relate to the third objective which is “*to critically evaluate best practices and lessons learned from managing major emergency in other countries in the UAE*”.

Sections 2.4, 2.3, 2.5 and 2.6 in the literature review chapter all critically examined and critique different existing research, text and secondary data on practices and academic explanations on dealing with ME, CP and effective contingency planning. Sections like 2.6 particularly focused on evaluating case studies of ME management in countries like UK, US, Japan and New Zealand. Findings from these revealed that lessons were being learned or have been learned from past ME and recommendations for improvement are being incorporated into planning arrangements.

Section 2.5 critically examined mechanisms for lessons learned and revealed that mechanisms ought to be both for remembering lessons learned and for utilising lessons learned (Brändström et al. 2004). While these findings are established from reviewing and critiquing different secondary data, the case study of ME in UAE indicate that none of these mechanisms exist in the UAE current arrangement.

The primary data analysis further exposed this gap as variables in ‘Factor 4’ from the questionnaire analysis revealed that documents on lessons learned are lacking. Thus, indicating that there are no mechanisms for remembering lessons learned from dealing with part ME. While documentation is not the only means for remembering lessons learned, incorporating lessons into CP planning arrangement is a more mandatory means of utilising lessons learned. A mechanism that is lacking also in the UAE arrangements for emergency planning and response. It means that for contingency planning to be taken

on board and effectively applied, there is need to clarify mechanisms for incorporating lessons learned, remembering lessons and utilising lessons in all the organisations responsible for response to ME.

#### **5.2.4 Challenges, Drivers and Barriers**

Three themes are embedded in this section, namely; ‘challenges’, ‘drivers’ and ‘barriers’. These themes are the core part of the fourth objective; *“assess challenges for dealing with, drivers for improving and barriers that hinder the ability to improve response arrangements for managing major emergencies in the UAE”*.

Challenges like location in which ME happen, the nature and scope of their occurrence and time they occur (Mitroff, 2004) were identified and assessed in section 2.7. The case study evaluation in chapter two revealed that these challenges were peculiar to managing ME in different countries, the UAE inclusive. However, other times of challenges, namely; communication, lack of knowledge and experience, nature factors, plan, lack of information, coordination, training, lack of public awareness, legislation and lack of equipment and resources were identified from the interview data analysis (Figure 4.10). But it can be noticed that these challenges identified by interviewees can be classified more as secondary barriers identified in section 2.7. Confusions such as this further emphasise the need for education on concepts of ME and CP, otherwise issues that need to be addressed will remain pending or confused with other issues.

In terms of drivers, some of the current good practices like early warning system, routine preparedness training and exercise and new technology and resources (variables identified in Factor 2). Practices such as different types of plans, risk assessment, readiness of national operation centre, staff communication and agreement with partners, smart maps and training, identified by Interviewees A1, A5, B1, B2, C2, C3, are some of the drivers for improvement identified. However, it needs to be emphasised that these are not ‘drivers’ peculiar to CP nor based on the understanding of the characteristics of ME. Thus, caution needs to be taken in deriving inspiration for improvement from existing practice that may not be linked to fundamentals of CP and characteristics of ME.

Therefore, it is important that recommendations for improvement derive context and contents from research results (secondary and primary data), so that the chances of

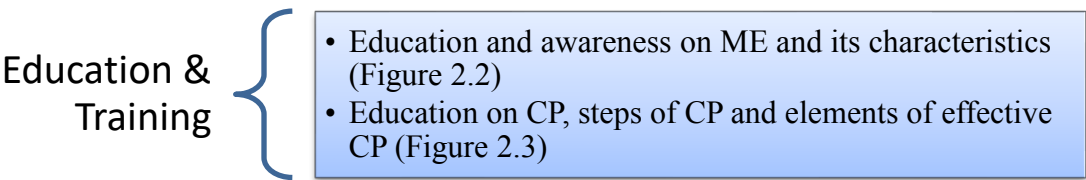


achieving a more effective practice and arrangements for ME can be higher. Furthermore, it is the aim of this research and that of the researcher to ensure that this study both increases understanding of issues peculiar to ME and CP. Through this means, the understanding can also translate into practice of effective management of ME using effective CP. Hence, the next section focuses on context and rationale for the guidelines to be developed based on the research results.

### 5.2.5 Context and Rationale for Guidelines

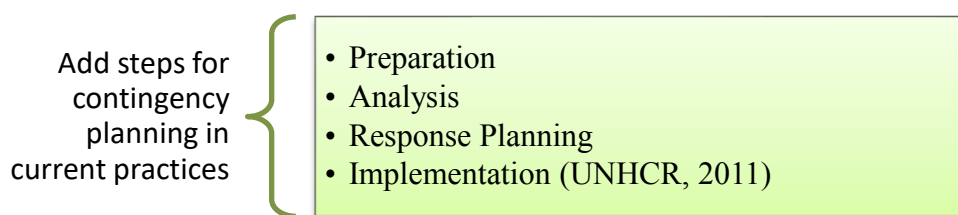
This section discusses the core of this research and the aim central to conducting this study, which is to “*develop guidelines guidelines for improving contingency planning, and recommendations for managing major emergencies in the UAE*”. As specified since the beginning of this chapter, recommendations for improvement are needed in the UAE emergency management so that better arrangement can be put in place for dealing with ME. However, given that few gaps have been identified during the investigation of this study, it is important to include measures that directly address these gaps and concerns.

For example, from the results for the first objective on definition/explanations of ME and CP, it is evident that education and training of personnel on ME and CP is important and needed. Hence, the guidelines for this is illustrated in Figure 5.1.



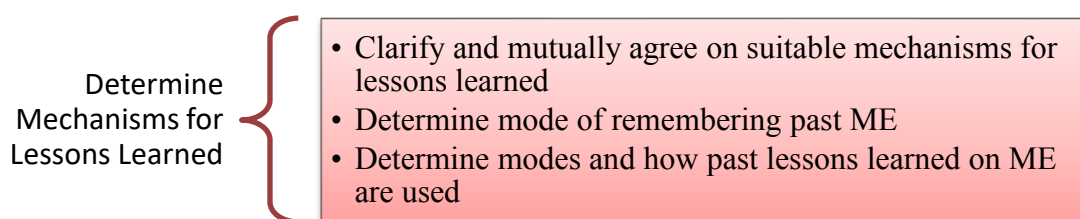
**Figure 5.1 First Principle for guidelines**

Figure 5.1 shows the content of the education and training programme or arrangement. These principle is applicable to all organisations that participated in this research, and those responsible for response to ME according to the legislation in the UAE. From the result on the second objective, improvement of current practices and arrangement for emergency management may remain for dealing with routine emergency. However, there is need to include arrangement for ME that is different from emergency. Therefore, the second principle is to utilise the good practice to improve the system but by focusing on ME and CP as shown in Figure 5.2.



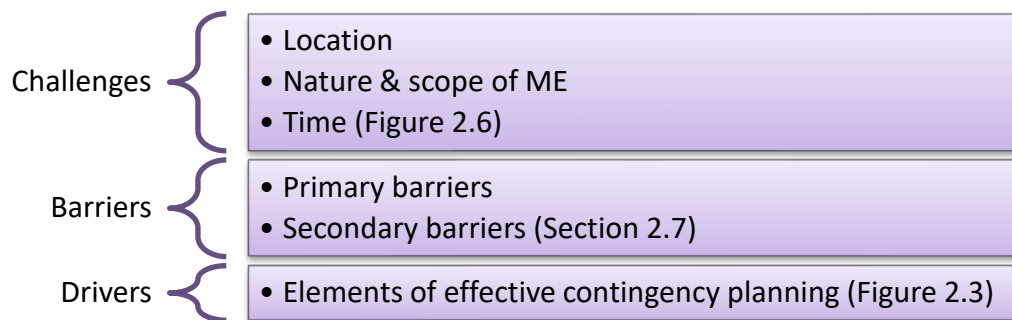
**Figure 5.2 Second Principle for guidelines**

As shown in Figure 5.2, incorporating steps for contingency planning in current practices and arrangements is crucial to embedding CP and arrangements for managing ME in future. This deliberate addition also forces officers and organisations responsible for planning and response to seek knowledge and understanding of CP and characteristics of ME that can influence their planning arrangements and analysis. Following this principle is the third principle which is derived from the results of the third objective. Figure 5.3 focuses on mechanism for lessons learned.



**Figure 5.3 Third Principle for guidelines**

The principle in Figure 5.3 needs to be specific to each organisation, although principles 1 and 2 had been generic to all organisation. At this point each organisation need to determine suitable mechanisms based on their structure and legislative duties in order to ensure that modes and mechanisms of lessons learned are widely known and acceptable in their organisation. For the fourth principle, the content is derived from secondary data in chapter two since the primary data analysis generated several confusion and information that were not related to epistemology in this field. Figure 5.4 outline the content of the fourth principle.

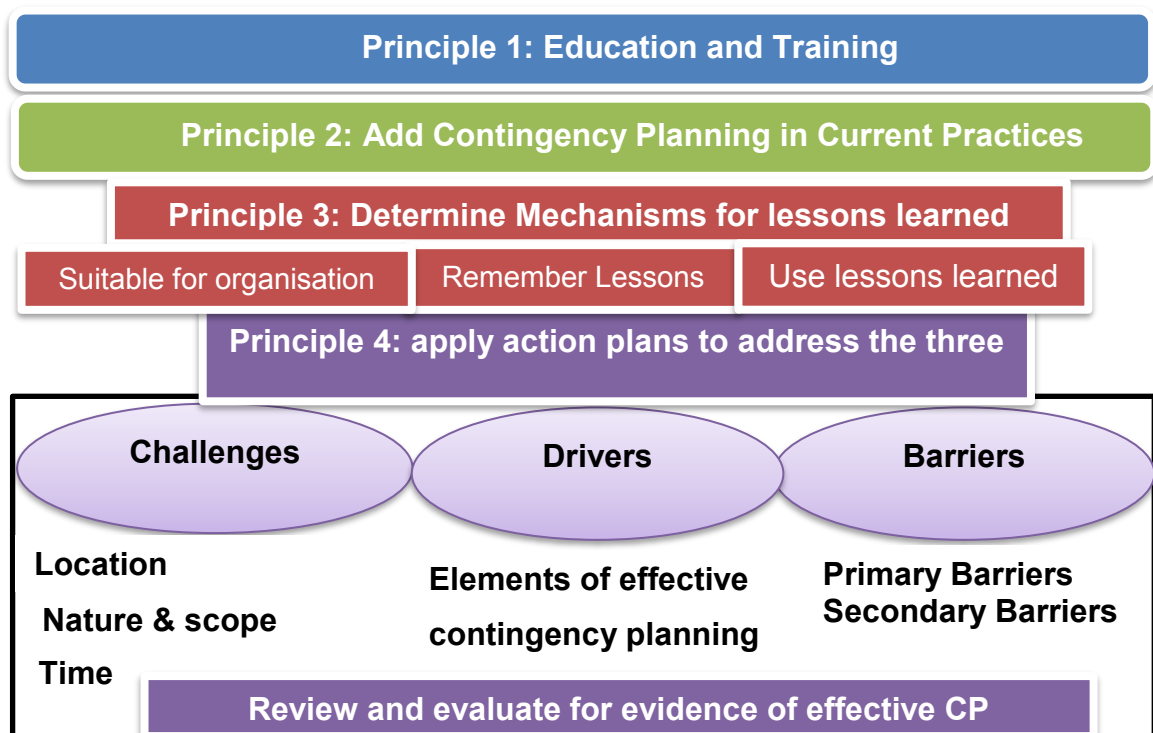


**Figure 5.4 Fourth Principle for guidelines**

Figure 5.4 embeds different findings of this study from secondary data in chapter two. Since chapter two is based on UAE, it can be said that the principle is evidence-based and reflective of the situation in the country. The four principles have been derived from the result of each objective leading to this last objective. While the findings of each objective provide context for the guidelines, gaps identified also provide rationale for developing the guidelines which is based on the research findings. Hence, the next section combines the four principles into steps that facilitates its implementation.

### **5.3 Guidelines for Contingency Planning for Managing Major Emergencies**

The explanations and rationale for the guidelines provided in previous section has contributed to the structure of the guidelines which are just directions for actions to take to improve the current practices in the UAE. The guidelines are expected to be followed like basic principles as explained in section 5.2.5, but may be utilised as a whole set of principles once it is embedded into the current practices and arrangements in the UAE. Figure 5.5 shows the relationship and flow in which the principles can be applied as a whole set of guidelines for ensuring that ME is more effectively managed using CP.



**Figure 5.5 Guidelines for contingency planning and management of ME in UAE**

As seen in Figure 5.5, the principles are compact and not necessary separated by arrows, which is because the principles overlap and elements of some principles are embedded in other principles. Thus, following each principle by using the guideline headings contributes to improvement of current practices, but also capacity development and procedures for managing ME. At the level where principle 4 is being actioned, better understanding of CP and ME should be attained. In addition, review and evaluation of arrangement need to be conducted as part of principle 4 to determine effectiveness of readiness arrangements for dealing with ME.

However, it is important to ensure that the best practice and lessons learnt from analysis of the international case studies in Chapter Two are incorporated in principle 3. Ensuring this will facilitate the review and evaluation that needs to take place as part of principle 4. Bearing this in mind, the specific guidelines for each organisation are discussed after application guidelines for each organisation responsible for emergency preparedness and response in UAE. Hence, application, suitability and assessment of these guidelines for ADP, Civil Defence and NCEMA are presented and discussed in next section.

## 5.4 Application of Guidelines

The guidelines illustrated in Figure 5.5 have been developed based on essential factors identified and justified based on epistemology in emergency management, ME and CP. While this suggest that the guidelines are valid, it is also important to assess the application of the guidelines against current level of knowledge and perspectives of organisations and personnel in organisations responsible for planning for and responding to ME. Figure 2.4 shows that organisations like the police, the Civil Defence and NCEMA examined in this research have duties, roles and responsibilities that include:

- ❖ Positive reaction to incidents
- ❖ Provide awareness plan and programmes
- ❖ Ensure safety, prevention, training, technical affairs and conference
- ❖ Develop and maintain national response plan (NCEMA, 2013)

While these responsibilities are generic to the organisations, the primary data collected indicate that the three organisations investigated have other specific roles and responsibilities in the event of ME. In terms of specific responsibilities, it was discovered that NCEMA is more of a coordinating agency responsible for planning arrangements leading to any disruptive event include ME. Both ADP and the Civil Defence are responding organisations who are present at the scene of any ME and have duties for ensuring safety and positive de-escalation of the ME. Clarifying these roles and responsibilities of organisations investigated in this research is crucial to the assessments conducted in this section.

### 5.4.1 Application of Guidelines in ADP

The inquiry with ADP suggest that knowledge and understanding of ME and CP is low compared to the epistemology in this field as identified in chapter two. The general consensus indicates that knowledge of officers and the arrangement in the organisation is ‘good’ regarding routine emergencies (*A3 when answering questions on experience in dealing with emergency*), but not for ME. In addition to this, CP is almost non-existence even though general plans exists which are not ‘good enough’, even though the organisation has about 97 plans for dealing with different incidents (A3). Even though

these plans are updated regularly (A1), most of the plans are old, need updating and reviewing so that they can be applicable and effective for use (A2, A4 and A5).

Collectively, when assessing current arrangements in ADP in relation to the ME guidelines, it was discovered that awareness of ME and CP is generally low. As identified in Section 4.2.1, there are no definitions of ME and CP, which indicate that there is no clear distinction between routine emergencies and ME. Lack of knowledge and clarity of what ME and CP is makes the first principle in the ME guidelines relevant. The first principle (Figure 5.1) shows the combined education and training for improving understanding and awareness of ME and CP. The first principle makes the second principle achievable and its outcome will tend to be more effective, since CP is also lacking based on the epistemology identified from literature. Lack of both ME and CP which makes the first principle relevant and suitable for ADP context as response organisation, means that the entire guidelines are suitable for the organisation.

For instance, some of the responders stated that lessons are being learned (A2, A4, A5), however, case studies of ME examined in chapter two shows otherwise. This means that lessons learned by ADP is not applied for planning for future ME which is an essential part of CP or perhaps not lessons learned are not related to ME. Another evidence identified during the inquiry process is that challenges explained by the interviewees and research participants are not related to challenges peculiar to ME. The challenges peculiar to ME relates to location, nature and scope of ME and time it occurs (Figure 2.6). While the case studies of ME in UAE correspond with these challenges identified in literature, those outlined and explained by research participants contradicts this. Triangulating the research results further exposes the confusion, low awareness and knowledge that may have resulted from lack of definitions for ME and CP in ADP.

Explanations in this section make the fourth principle relevant to ADP, if the current arrangements are to be improved for managing future ME. Therefore, as a response organisation who takes primacy of all incidents in Abu Dhabi and the region it is necessary for ADP to adopt the guidelines developed from this research findings. Particularly so, the fourth principle require that action plans are taken to address challenges, barriers and improve drivers as illustrated in Figure 5.5. Table 5.1 shows the outcome for assessing the suitability of the guidelines for ADP:

**Table 5.1 Assessment of guidelines for ADP**

<b>Principle</b>	<b>Required</b>	<b>Remark</b>
<b>1. Education and Training</b>	√	Needed to clarify what ME and CP is and the necessary actions plans for improving current practices and arrangements
<b>2. Add CP in current practices</b>	√	Since current practices lack definition and good understanding of ME and CP, it is required to add CP to current practices
<b>3. Determine mechanisms for lessons learned</b>	√	Regular training is one of the practices mentioned by ADP participants as one of the means for preparing for ME or any incidents. Therefore, training can be used as mechanisms for remembering and utilising lessons learned
<b>4. Apply action plans to address challenges, drivers and barriers</b>	√	Training that includes lessons learned need to use location, nature and scope of incident and time as parameters for building response capacity. Since training is one of the drivers identified in ADP, this can be used to eliminate the primary and secondary barriers

Table 5.1 shows the outcome of the guidelines assessment in ADP. It can be observed from this assessment that every principle in the guideline is needed for improving the current arrangements for managing MEs. In order to ensure that principle 3 and 4 are effectively applied and successfully implemented in ADP, it is important to incorporate the best practice and lessons learnt from analysing the international case studies from Japan, US, UK and New Zealand. Therefore, the specific guidelines and recommendations drawn international case studies in Table 2.7 for ADP are:

- 1) Best Practice for dealing with complexity, frequency, unpredictability and unprecedented nature of MEs.

- Complexity of MEs - as an emergency response organisation, ADP should assess past MEs and use the information to improve planning, and response to future MEs (Oskin, 2015).
- Frequent MEs - ADP will benefit from using preventive measures such as physical signs, road closure and traffic control, road surface marking and signing to mitigate the impacts of highway collision caused by fog (Copeland and Overberg, 2015).
- Unpredictability of MEs – ADP will need to conduct an independent review (public or external audit) for past ME response, in order to identify good and bad practice that can influence future plans and planning process (The Pitts Review, 2008).
- Unprecedented MEs – It is important to improve current response framework based on major recommendations from review and investigation of past MEs if any investigation was conducted (McLean et al. 2012). If none, then it is important to investigate past MEs to identify major recommendations that can be used to improve the UAE response framework.

## 2) Lessons learned from Japan, US, UK and New Zealand.

- Learn to use cognitive i.e. using better understanding of knowledge, decision making and problem-solving processes as mechanisms to plan for future response to MEs (Lesson from Japan).
- Make learning an ongoing process that identifies challenges from dealing with past MEs, and enforce accountability from individuals for accidents, and bad management of ME response (Lesson from US).
- Ensure that lessons are learned by doing, use lessons identified from the review process and use it to improve planning for future MEs (Lesson from UK)
- Use outcomes of investigation, and reviewed response framework to train and educate all officers that will be involved in ME response. A learning manual may also be developed to help officers learn their roles and responsibilities, and to better understand the requirements for dealing with MEs (Lessons from New Zealand).



The improvement that will result from adopting the best practices and lessons learned from Japan, US, UK and New Zealand will subsequently increase the capacity of ADP as a response organisation so they are better placed to deal with future MEs and any routine emergency.

#### **5.4.2 Application of Guidelines in Civil Defence**

The Civil Defence is another response agency that takes procedures in reaction to an emergency, a crisis or disaster in order to mitigate the effects of the emergency and offer assistance and support for the society (NCEMA, 2007). This main duty requires that the Civil Defence and the ADP both have good understanding of the ME and CP so that impacts of ME can be properly mitigated. However, the current practices and arrangements in this organisation as explained by participant B2 indicate that response during ME especially during the 2008 incident was ‘random’, where coordination and preparedness were not sufficient between the first response agencies. Participants B2, B3 and B5 explained that lessons have been learned from the 2008 ME and better coordination have been put in place to improve response to 2011.

This testimony gives evidence of lessons learned in the Civil Defence, even though B4 explained that: *“our plan is good and effective, we did training for this scenario before, but the problem was that there was misunderstanding who will control that accident”*, and B5 said; *“my organisation was involved in response to the fog accident 2008 and 2011 – had no response plan for the first accident, but the response for the 2011, the plan was effective, but there were some mistakes”*. The acknowledgement that misunderstanding and mistakes still occurred despite lessons learned when the last evident similar to an ME occurred, strongly shows that the current practices and arrangement lack best practices in ME and CP.

Based on this evidence and explanations provided during the interview sessions with Civil Defence participants, it appears that reference to dealing with ME that occurred in 2008 and 2011 indicate elements of lessons learned in the Civil Defence. However, because no definition of ME exists in the organisation like ADP, it is important to incorporate education program that addresses this issue to prevent confusion during response. As acknowledged by the B4 and B5, there were mistakes and misunderstanding during response to 2011 incident despite lessons learned.

As seen in the case studies examined in chapter two, mistakes in managing ME can be costly and may result in severe impact. While the participants state that lessons are being learned, it is evident from their explanations and case study evaluation that the lessons are not based on principles 1, 2 and 3 of the guidelines and elements of Figure 5.5 explained in previous chapter. Therefore, the assessment indicates that education that teaches the concepts of ME and CP as examined in this research is important for the Civil Defence in order to better and effectively deal with ME in future without mistakes and misunderstanding. Experiencing mistakes and misunderstanding during response to every ME makes principles 1, 2, 3 and 4 equally important in Civil Defence. Thus, Table 5.2 illustrates the outcome of the assessment conducted on the Civil Defence.

**Table 5.2 Assessment of guidelines for Civil Defence**

<b>Principle</b>	<b>Required</b>	<b>Remark</b>
<b>1. Education and Training</b>	√	Needed to clarify what ME and CP is and ensuring that mistakes and misunderstanding are clarified in all education and training programmes
<b>2. Add CP in current practices</b>	√	Current plans developed based on lessons learned need to be reviewed to ensure that all elements of effective CP are added
<b>3. Determine mechanisms for lessons learned</b>	√	Developing plans based on lessons learned was identified by the Civil Defence participants as one of the means for improving response arrangements. Therefore, plans should be developed using elements and steps for effective CP and reviewed after every ME incident
<b>4. Apply action plans to address challenges, drivers and barriers</b>	√	Plans which is the best practice in Civil Defence need to outline the arrangements and procedures for dealing with challenges such as location, nature and scope of incident and time. Drivers identified in Civil Defence i.e. developing plans should also be used as a tool for managing primary and secondary barriers

Table 5.2 shows that Civil Defence situation is slightly different from that of ADP in that the best practice identified in the organisation which is also a response organisation is development of plans and not conducting trainings like ADP. The assessment also revealed that traces of lessons learned exist in the organisation and attempt is being made to use past ME to improve their response arrangements. But as acknowledged by some of the participants (B4 and B5), misunderstanding and mistakes continue to frustrate the process. The assessment outcome shows that the existing practices need to be reviewed so that plans developed from lessons learned can include steps of CP and definition of ME for clarity and distinction.

Therefore, the guidelines are needed in the Civil defence, due to the outcome of the assessment conducted. The outcome also implies that principle 3 and 4 are important in Civil Defence, especially for the guidelines to be successfully applied and implemented. As done for ADP, it is recommended that the Civil Defence incorporate best practice and lessons learned from Japan, US, UK and New Zealand. Civil Defence need to adopt lessons and best practice from these countries, and ensure that lessons and specific action plan focus on addressing the complexity, frequency, and the unpredictability and unprecedented characteristics of MEs as explained in A and B below.

1) Best Practice:

- Complexity of MEs – Civil Defence should assess past MEs and use the information to predict and plan response requirements for dealing with the complexity of MEs (Oskin, 2015), especially those will may result in search and rescue, and fire.
- Frequency of MEs - preventive measures such as educating the public, road users and transport companies on impacts of weather on driving and work with the police to hold individuals liable for consequences of accidents and damage (Copeland and Overberg, 2015).
- Unpredictability of MEs – outcomes of independent review should be used as a pre-plan measures that influences planning process and activities, and not as ad-hoc (The Pitts Review, 2008).
- Unprecedented MEs – response framework and manual written based on lessons learned should be used as working guide for developing training courses for all gold, silver and bronze commanders.

## 2) Lessons learned:

- The Civil Defence should use knowledge, decision making and problem-solving processes as mechanisms to prepare procedures for MEs (Lesson from Japan).
- Learning should be considered as an ongoing process so that challenges from dealing with past MEs are identified and used for every public education materials on safety and actions during MEs (Lesson from US).
- The Civil Defence should demonstrate lessons learned by taking actions that reflect learning has taken place. This can be done by using examples or scenarios from past MEs to train and for exercise purpose (Lesson from UK).
- Efforts should be made confirm outcomes of investigation conducted on past MEs so that the outcomes and the response framework can be used to educate officers (Lessons from New Zealand).

The improvement that will result from adopting the best practices and lessons learned from Japan, US, UK and New Zealand is key to improving the current status of the Civil Defence. The combination of best practice and lessons learned outlined in A and B above are also important for building the minimum capacity level for dealing more effectively with future MEs.

### 5.4.3 Application of Guidelines in NCEMA

The assessment conducted in NCEMA shows that the situation and need in the organisation differ from those in ADP and the Civil Defence. While it was generally accepted by senior officers that no definition for ME and CP in the organisation (section 5.2.1), interviewees indicate that some best practice exist, even though there is need for improvement. NCEMA being a coordinating organisation for other emergency agencies helping them for joint planning and response identified lack of joint procedures for emergency (C1). Participants like **C5** explained in terms of coordination; *“good and effective, there is presence of NCEMA to organise all partners and to coordinate all agencies”*, while **C6** said; *“the response was better during cyclone Phet compared to cyclone Gonu, because during Phet we have NCEMA that played coordination roles and*

*identified duties and plans for response*". From this answers it appears the functions of NCEMA is more effective in certain emergencies which are not ME than for ME.

While cyclone Gonu was a natural hazard event, it did not have the characteristics of ME that escalates through stages as a process explained by Turner and Pidgeon (1997) or event with an overwhelming onset (Mitroff, 2004). Thus, ability of NCEMA to coordinate MEs is questionable since case studies examined in chapter two shows lack of coordination. This misunderstanding about what constitute to ME further emphasises the fact that awareness and knowledge of ME is low in NCEMA as it is in ADP. This low knowledge makes principle 1 in Figure 5.1 necessary to increase knowledge and awareness. Increasing knowledge among emergency managers and planners according to Alexander (2002) is crucial for ensuring more effective response during response to major emergencies.

Principle 2 and 3 is also important because C1 acknowledged that current practice in NCEMA is *"not good enough because it lacks doctrine and procedures between all organisations and authorities have their own standards which are different from others"*. Applying Principles 2 and 3 is important to ensuring that a centralised or unified procedure is created and used by all organisations responsible for managing ME. Furthermore, as seen in the case of ADP and the Civil Defence, lack of clarity on what ME and CP are may be said to be responsible for lack of direction and procedures that are suitable for managing ME. This makes first, second and third principles very applicable and necessary in NCEMA as the coordinating arm for all organisations responsible for response to ME.

The best practice identified by C1; *"we have good level of cooperation and coordination between all agencies, from national operation centres and operation centres for local level, to professional team to manage emergency for national and local level, NCEMA identifies and selects individuals who have expertise and are capable of supporting critical incidents"*. Unfortunately, this good practice is yet to be extended to management of ME largely because organisations are unclear about what constitute ME and lack of CP for dealing with them. C2, C3, C4 and C5 all said in different ways that; *"doctrine and joint procedures for risk assessment and joint planning and communication systems"* for emergencies like ME are needed. Therefore, the assessment of the guidelines in NCEMA is shown in Table 5.3.

**Table 5.3 Assessment of guidelines for NCEMA**

<b>Principle</b>	<b>Required</b>	<b>Remark</b>
<b>1. Education and Training</b>	√	Needed to clarify what ME and CP is so that procedures for coordinating all response organisations can be made clearer and communicated
<b>2. Add CP in current practices</b>	√	Actions and leadership needs to be taken by NCEMA to include steps for effective CP in the procedures for planning and response framework for managing ME
<b>3. Determine mechanisms for lessons learned</b>	√	Lessons learned must be integrated into procedures as demonstrated in the case of procedures for Cyclone Gonu and Cyclone Phet.
<b>4. Apply action plans to address challenges, drivers and barriers</b>	√	Procedures that include lessons learned, ME and CP need to be practiced and communicated to all emergency organisations that NCEMA coordinate for planning and response.

Table 5.3 shows that the guidelines are both applicable to the NCEMA system using the good practice implemented by the organisation. Being a coordinating organisation, it is important that NCEMA demonstrate leadership in providing directions and documenting procedures that are based on principles identified from this research so that future ME can be better managed.

However, the improvement required will be achieved by taking on board specific lessons and best practices identified from analysing the international case studies from Japan, US, UK and New Zealand. It is recommended that NCEMA builds on the good practice in the organisation as the coordinating organisation. It is also important that focus is placed on how to effectively utilise principles 3 and 4 which will enable the organisation to ensure

that best practices and lessons learned from countries analysed in this research are utilised to improve current status of emergency preparedness and response.

1) Best Practices target measures for dealing with complexity, frequency, unpredictability and unprecedented nature of MEs.

- Complexity of MEs - as the coordinating organisation, NCEMA should take on the responsibility to assess past MEs and use the information to improve prediction, planning and response to future MEs (Oskin, 2015). Once the prediction, planning and response process is completed, the outcomes should be communicated and shared with ADP and Civil Defence so that all organisations can use the outcomes to collectively improve their procedures.
- Frequency of MEs - preventive tangible and intangible measures to mitigate the impacts of frequent MEs by having policies that will make individuals more liable financially for consequences of motorway accidents (Copeland and Overberg, 2015).
- Unpredictability of MEs – NCEMA should lead the independent review (public, internal and / or external audit) of past ME response, in order to identify good and bad practice that can influence pre-plan measures, policies and planning process (The Pitts Review, 2008).
- Unprecedented nature of MEs – current response framework should be improved using outcomes of any review or investigation process, and training manual developed from the outcomes that can help ADP, Civil Defence and NCEMA officers improve their capacity and capability for response to future MEs (McLean et al. 2012).

2) Lessons learned from Japan, US, UK and New Zealand.

- NCEMA should use knowledge of past MEs as mechanism to influence decision making and problem-solving processes for dealing with future MEs (Lesson from Japan).
- Learning must be adopted as an ongoing process that focuses on identifying challenges experienced when dealing with past MEs, and use the process to monitor accountability of ADP and Civil Defence planning for and responding to MEs (Lesson from US).

- Ensure that lessons are learned by doing, use lessons identified from the review process and use it to improve prediction and planning process for future MEs (Lesson from UK)
- Use outcomes of investigation, and reviewed response framework to train and educate all officers that will be involved in dealing with future MEs. A learning manual may also be developed to help emergency organisations learn their roles and responsibilities, and to better understand the requirements for dealing with MEs (Lessons from New Zealand).

The improvement that will result from adopting these best practices and lessons learned from Japan, US, UK and New Zealand will be crucial in helping NCEMA, ADP and Civil Defence improve current emergency management practices. It will also play important role in helping to increase capacity and capability of each organisation to deal with both future MEs and any routine emergency.

Establishing the specific roles of the principles and guidelines developed from the research outcomes in each organisation is important to ensuring that ME is managed in a more effective manner in the UAE. This section has acknowledged and demonstrated the understanding that each organisation has specific, but complementary duties that need to be better coordinated and driven by procedures built on the guidelines developed in this research. This section also reveals the suitability of the guidelines for UAE lead emergency organisations, but the next section aims to examine the suitability of guidelines for the UAE arrangements in order to better explain and justify the recommendations for effective application of the guidelines.

## **5.5 Suitability of Guidelines for UAE Arrangements**

The assessment conducted, explained and justified using perspectives of the participants from all the organisations examined in this research has shown that best practice or good practice in each organisation vary. For instance, Table 5.1, 5.2 and 5.3 all shows the reference to best practice in each organisation and how the guidelines and principles can be adopted and implemented using the best practice in place. In summary, the best practice and mechanism for lessons learned in ADP is training, Civil Defence emphasised their ability and strength in documenting plans and using plans developed that teaches areas of improvement to better prepare for dealing with future emergencies. But it can be



seen from the case studies examined in chapter two that this is not enough, hence the need for the guidelines.

NCEMA being the coordinating organisation for ADP, Civil Defence and other organisations has emphasised their coordinating authority and that using procedures and coordination is the best practice that helps the organisation better plan for and manage ME. Establishing this background is important for discussing the wide scope in which the guidelines will be applied. For example, Figure 2.5 (aspects of emergency and crisis management and Table 2.3 show the emergency and crisis management phases and meanings in UAE developed by NCEMA. Table 2.3 explains what each phase means and the requirements for each phase, but emphasis is on the preparedness and response phases which are excerpted and shown in Table 5.4.

**Table 5.4 Meaning and context for Preparedness and Response phases**

<b>Phases</b>	<b>Meaning and context</b>
Preparedness	<u>Taking the procedures</u> related to preparing resources, capabilities, and plans to respond to emergencies, crises and disasters that might occur in the future. This stage includes developing, co-ordinating and training on the National Response Plans.
Response	<u>All procedures developed and implemented</u> during any ME sufficiently prevent escalation of the emergency, reduce the impact(s), and ensure that resources are promptly mobilised and adequate for aid and support for affected location/society.

Table 5.4 shows that procedures (underlined) are the fundamental doctrine that drive these two phases. The table further shows that preparedness and response phases which are the relevant phases to this research, are informed by procedures, which then influence preparing of resources, capabilities and plans for dealing with emergencies, crises and disasters. Thus, the dual emphasis to procedures in these phases indicate that NCEMA which has best practice for using procedures tend to be best positioned to facilitate the implementation of the guidelines developed in this research.

NCEMA being the coordinating organisation responsible for ensuring cooperation between emergency organisations can be said to have the organisational and legislative capacity to facilitate the application of guidelines. A process that can be conducted by NCEMA by incorporating the principles into procedures for emergency planning and response for ME. While this implementation possibility is based on cross-examination of data discussed in chapter two and those analysed in chapter four and discussed in this chapter, the assumptions are also based on the improvement that have taken place in responding to ME since the inception of NCEMA. It can then be said that, NCEMA has the capacity to influence improvement through education and training based better understanding of ME and CP.

Furthermore, the role of NCEMA in documenting procedures and providing guidelines for better understanding is evident given that all references used in this research that relate to the UAE are also sourced from NCEMA. This fact is another evidence that corresponds with the explanation of C1 which states that NCEMA has “*good level cooperation and coordination between all agencies.....’NCEMA identifies and selects individuals who have expertise and are capable of supporting critical incidents’*”. Perhaps NCEMA should be using the good level of cooperation and coordination between all agencies to better train and educate them about ME and CP. To also develop procedures based on this that can enable the organisations work together and cooperate for planning for and responding to ME using CP, rather than selecting individuals.

As identified from the explanations of ME in section 2.2.2, MEs are not incidents that individuals can manage effectively, the explanations of ME and the challenges which relates to location, time, nature and scope strongly indicate that several organisations need to collaborate for effective response. Thus, it can be inferred that the guidelines are suitable for the UAE emergency planning and response arrangements. However, the triangulation and analysis of secondary and primary data indicate that NCEMA has more legislative arrangement and responsibility that may aid the implementing of the guidelines in UAE. Thus, assessing the suitability of the guidelines also shows that the guidelines may be more success when taken as procedures that relate to preparing resources, capabilities, and plans and CP to respond to ME.

While cooperation is strategic to the whole process of taking procedures for planning and using all procedures taken for response, it is important that procedures are understood through training and plans. All underlined words were all identified as best practice

already present in each organisation examined in this research, which shows that the guidelines are suitable. It also shows that the guidelines are adaptable within existing arrangements in the organisations and in UAE emergency management system. Thus, it can be inferred that the guidelines along with the principles outlined in it are suitable for application in the UAE system and adoptable for use by the organisations responsible for managing ME. However, it is important to emphasise the tactical role CP plays in the whole process as well as the need for recommendations for implementation, which are outlined and briefly explained in the next chapter.

## **5.6 Summary of Chapter Five**

This chapter has discussed the outcomes of the research, especially the contribution of each objective to developing the guidelines for contingency planning that can improve the effectiveness of response to ME. The extended discussion in this chapter has also demonstrated how the research questions set as parameters for achieving the research aim has been achieved. The first research question: “Are the current practices for emergency management in the UAE sufficient for managing major emergencies?”

This first research question has been answered in chapters two. However, confusing information provided by the interviewees indicate that there is need for improvement, although the case study evaluation has confirmed that the current practices are insufficient for managing major emergencies. Specifically, there needs to be better understanding of ME and CP, and to incorporate steps of CP and elements of effective CP into the current practices for emergency management so that there is more effective procedure and arrangements for managing ME.

The second research question; “How can lessons learned from responding to past ME be used to improve planning for response to future major emergency?”

This question was mostly answered through the literature review which indicates that lessons learned need to have mechanisms so that modes for remembering past events, and using lessons facilitates the learning process. Lesson learned can be used by including it into planning arrangement as discovered in the elements of effective contingency planning which includes component of lessons learned. Given that there is no mechanism for lessons learned in the current practices and arrangements, recommendations have been

incorporated into the guidelines to ensure that mechanisms for learning lessons are taken on board in each organisation responsible for response to ME.

Though possible to apply principles of the guidelines developed to other areas of emergency management or in preparing for response to routine emergencies. The focus of these findings has been retained on ME, and principles should be used for enhancing preparedness and response to ME. This chapter has discussed the research results for each objective leading to the fifth objective which is to develop guidelines for CP and managing of ME in UAE.

The guidelines developed were also assessed to illustrate its implementation. Although recommendations for implementation is required, the recommendations are discussed in the next chapter. This chapter has assessed the suitability of the guidelines in ADP, the Civil Defence and NCEMA. It has also assessed the suitability of the guidelines for the emergency management arrangement in the UAE. The outcome of all assessments conducted and discussed in this chapter has shown that the guidelines are suitable for UAE and for improving planning for and responding to ME.

However, the assessment also reveal that NCEMA appears to be best positioned to lead the implementation of the guidelines. This is due to the best practice in procedures and in motivating cooperation between different which the organisation has demonstrated in recent years according to data collected. Different gaps were identified in the current practices and arrangements which strongly emphasise the need for improvements that start with education and training.

The relevance of the research results to the study scope is also briefly discussed by answering the research questions. Thus, the next chapter concludes this research by summarising the main findings of this research and how the recommendations for implementation is both strategic and tactical for improved practice of planning and response to ME in the UAE.

## **CHAPTER 6: Conclusions and Recommendations**

### **6.1 Introduction**

Guidelines have been developed based on the research findings as recommendations for improvement to the United Arab Emirates (UAE) governing authorities to manage Major Emergencies (ME). The research findings also provide insight into the status of current practices and arrangements in the UAE for dealing with ME. Some of the findings were reassuring that improvements are possible within organisations responsible for managing ME. But more important is that, this research has also identified areas where specific actions are required so that improvements lead to better management of ME and the minimum requirements for effective CP.

This chapter summarises the thesis by specifying the findings for each objective and how the outcomes were reached. Sections in this chapter also discuss recommendations for future research and the potential contributions of advancing knowledge in the study area explored in this research. The research contributions and limitations both discuss the main issues that are other researchers need to critically consider when conducting researches peculiar to this field of study. The last section summarises this chapter and the main points of this research.

### **6.2 Main Findings**

Planning for and responding to any scale of emergency can be challenging, how much more a Major Emergency (ME). As analysed and explained in this research, ME is a peculiar type of emergency, not because of its causes, but because of the characteristics that may it challenging to manage by emergency organisations. The occurrence and impacts of ME in the UAE have led to carrying out this research which has revealed a number of areas where more explanations or research will be needed in future. But within the research scope, the research inquiry and process has helped to achieve the research aim and objectives.

It was intended at the beginning of this research to develop guidelines and recommendations for UAE governing authorities in order to ensure better management of ME using CP, this aim has been achieved. Specific findings were derived from data

collected through methodology strategy like literature review, case study evaluation, interview and questionnaire administration, and analysed through triangulation.

The findings led to guidelines developed in chapter six and illustrated in Figure 5.5. The following are the main research findings:

**The first objective** has enabled the research better understand and provide more in-depth explanations of ME and CP. The main findings from this objective is that emergency organisations in the UAE responding for managing ME do not have any clear definition or common and well-informed understanding of ME and CP (Sections 4.2 and 4.5). Based on the academic and practice explanations that relate to these two concepts, it was discovered through semi-structured interviews with participants from ADP, Civil Defence and NCEMA that knowledge of ME and CP is very low (Section 4.6) and vary from organisation to organisation (Sections 5.4). As a result of these findings on lack of definition and low knowledge of ME and CP, the guidelines developed included principle that provides direction for education and training on the concepts (Figure 5.1).

The main findings from the **second objective** further exposed the insufficiency of current practices and arrangements in the UAE for managing ME. After evaluating existing document on the UAE emergency management arrangements (Section 2.4), and current practices in managing past ME through case studies evaluation (Chapter Two), it was evident that current practices and arrangements need improvements. In general, the UAE governing authorities do not have any holistic and acceptable definitions or clarity on what constitute to ME, which raises concerns on how they can manage future ME when they do not know what ME is. The findings further revealed that practices vary from organisations to organisations due to specific duties of each organisation in emergency management. Understanding the specific legislative duty of each organisation informed the recommendations offered for improvement explained later in this chapter.

Findings from the **third objective** are that best practices exists in countries like the United States, United Kingdom, Japan and New Zealand in managing ME. These best practices include adopting lessons learned, and having mechanisms in place for using the lessons learned. Mechanisms in these countries are either intentional or/and political mediums for ensuring that management of future ME are more effective (Table 2.7). However, the findings derived from case study evaluation (Chapter 2) and primary data analysis and

discussions (Chapters 4 and 5) indicate that the UAE has best practice for managing other types of emergencies, but not for managing ME.

Although the participants tried to explain existing arrangements and current practices used for dealing with all form of emergencies, their descriptions fail to align with the explanations, definitions and description of ME and CP examined in the literature review. Confusion and several contradictory information were provided by participants on what they consider ME and CP, which further emphasised that there is low or lack of understanding of both concepts. While some called MEs as incidents that are managed through day-to-day arrangements, others called CP special plan for dealing with nuclear emergencies (Chapter 4). It is generally known that UAE is yet to commission its nuclear energy plant, being aware of this point, one wonders how a plan or arrangement can be in existence and considered good if it is yet to be used for managing an actual incident. Another main finding generated from the objective three is that even though elements of best practice exist in each organisation, there are no mechanisms for remembering and utilising lessons learned for better response to ME (Chapters 4 and 5).

Unlike other countries examined in Chapter Two, UAE lacks mechanism and ability to use mechanisms or existing best practice as tool or mediums for remembering lessons learned from past MEs, so that future MEs can be better dealt with. The obvious lack of mechanisms further confirms the lack of CP and the need to ensure that any recommendations for improvement include the elements of effective CP for managing MEs (see Chapter 2). Therefore, gaps from the findings from the third objective motivated the need to include principle 3 in the guidelines which has the goal of ensuring that the mechanisms for lessons learned are factored into planning and response arrangements for future ME. The guidelines also encouraged that CP play a central role in influencing all action plans in these phases.

**Objective four** generated some findings. Challenges relating to managing ME were identified from the literature review as location, time, scope and nature of ME (Figure 2.6). However, the findings from the secondary data analysis show that the UAE emergency organisations identified challenges that do not relate to ME. This further exposes the low knowledge and lack of understanding of what ME is, a finding that also influenced the components of the guidelines in Figure 5.5. In terms of drivers, the literature review led to the understanding that all concepts of ME and CP are essential drivers for better management of ME (Table 2.8). However, the findings from the primary

data analysis did not reveal any significant drivers in the UAE. These findings can be linked to the barriers identified in the literature review (Section 2.7), which were also similar to those identified from the UAE organisations (Section 4.6).

The **last objective** which is to develop guidelines as recommendations for CP and for managing ME in the UAE had been achieved through the illustrative guidelines in Figure 5.5 which is assessed in section 5.4.

From the research findings listed above, it can be observed that a few positives such as existence of best practices in the three organisations (ADP, CD & NCEMA), were generated from the research investigation process and from using mixed methods of data collection techniques. Adopting this method also encouraged triangulation of data and in arriving at more reliable outcomes. However, the negatives; lack of definitions for MEs and CP, low knowledge and understanding of MEs and CP, lack of mechanisms for lessons learned, existence of challenges that may continue to hinder any arrangements for dealing with MEs without the application of effective CP, were identified and have been critically examined, compared with other data sources and analysed in order to achieve valid and objective outcomes. The outcomes from this process further influenced the components of the guidelines which is expected to influence change and motivate a commitment to improving the practices and arrangements for planning and response to ME.

While all research objectives and aim were achieved, the process led to the discovery of different gaps that influenced the recommendations summarised in section 6.3. It is believed that by adopting the guidelines developed in this research for use in the UAE and led by NCEMA who has legislative authority for coordinating all emergency organisations, improvement may be insight. Furthermore, the research questions which sought to answers to the following:

- ❖ Are the current practices for emergency arrangements in the UAE sufficient for managing major emergencies?
- ❖ How can lessons learned from responding to past major emergencies be used to improve planning for and response to future major emergencies?

Have been answered based on the findings outlined which indicate that the current practices for emergency arrangements in the UAE are insufficient for managing ME. In relation to lessons learned, training, development of plans based on past ME and



embedding concepts of ME and CP into procedures (Section 5.4) jointly understood and implemented by ADP, Civil Defence and NCEMA are some of the effective ways identified in this research as mechanisms for ensuring that lessons learned are used to improve planning for and response to future ME. It is emphasised throughout this research that a better understanding of MEs is key to being able to develop contingency planning arrangements that can lead to more effective management of MEs. CP as examined and explained in this research need to include minimum elements such as identifying potential for dealing with ME and process and assessing those potentials. Other elements of CP are, having a good, reflective and detailed assessment of probability and consequences of ME and its process, lessons learned and mechanisms, and clear scope of contingency planning (see Section 2.3.1). These elements can be conceptualised into four steps i.e. preparation, analysis, response planning and implementation (see Section 2.3.1). The recommendations for practice and application in the UAE are explained and summarised in the next section.

### **6.3 Recommendations for Implementation**

This section discusses the recommendations derived from this research. There are recommendations for future research and recommendations for practice. The recommendations for practice focus on the specific areas and how the guidelines developed in this research may be applied in the UAE context. The recommendations for future research motivates investigation into areas that focus on ME and CP, since this research has demonstrated that there is need for more knowledge in this study area. An inquiry along this line may be helpful in increasing knowledge of ME and creating more awareness of its theoretical context. Recommendations for improving the current practice and emergency management arrangement for ME have been implied in chapters five, six and in this chapter, this section combines and summarises the main recommendations that relates to each research objective.

**Recommendation one:** it is recommended that the first principle in the guidelines are implemented in each organisations. The critical review of concepts of ME and CP has shown that UAE emergency organisations lack definitions and good understanding of ME and CP. Both secondary data (literature review and case study evaluation) and primary data (questionnaire and interview) exposes this gaps. This is necessary in order to increase

understanding, so that informed decisions and procedures can be put in place that are sufficient and suitable for managing ME.

**Recommendation two:** it is strongly recommended that the guidelines developed from this research need to be implemented as a consolidated unit. The current practices and arrangements in the UAE appears to be sufficient for dealing with low scale emergencies, but they are insufficient for dealing with ME. Case study evaluation and interviews from participants from all organisations acknowledged that the system and arrangements need to be improved. While evidence of good practices exists in each organisation, none of the best practice exist in sufficient capacity for managing ME effectively. Furthermore, this recommendation is important because best practice suitable for dealing with ME need to be founded on steps for effective CP which is not visible in the current arrangements.

**Recommendation three:** Mechanisms for lessons learned need to be reviewed regularly to ensure that lessons are transferred from past incidents to plans and arrangements for future planning and response. The indicators for measuring this outcome should be based on mistakes not repeating or recurring when similar incidents occur. It is also important that lessons learned are understood using the scope of challenges peculiar to ME and not challenges peculiar to administrative issues in each organisation as erroneously assumed by the research participants.

**Recommendation four:** challenges and barriers should be managed by action plans peculiar to ME, but using factors that drive the organisation and its success in responding to other incidents. This is recommended so that existing best practice are used to motivate improvement in areas that are insufficient or ineffective arrangements.

**Recommendation five:** it is necessary to adopt the guidelines for use in order to improve the current arrangements. It is also recommended that while all organisations responsible for response implement the guidelines, NCEMA will do well to incorporate the guidelines into strategic and tactical procedures for planning for and responding to ME.

These recommendations are all implied and in some cases explicitly discussed in this chapter and previous ones. However, this summary further emphasises the action plans for implementation so that emergency planning and response for future ME can be improved.

#### **6.4 Research Contributions to Theory and Practice**

Despite the research limitations, contributions worth mentioning have been made through the research outcomes. From the explanations provided so far, the research findings have contributed to knowledge in emergency, crisis and disaster management field. Contributions made have been specific to areas of emergency planning and response to ME by enhancing knowledge of characteristics of ME, necessary steps for effective CP and an overall comprehension of challenges that make ME difficult to manage by emergency organisations. Contributions to theory relates to improving knowledge and understanding of MEs, CP, process for learning lessons from past MEs and how to use past lessons for planning for future ones. Identifying mechanisms that may be used for identifying and using lessons by emergency organisations is a major contribution to theory and practice.

In terms of contributions to theory, this understanding indicates that, while existing literature talked about fantasy document (Birkland, 2006), meaning that emergency organisations only identify and document lessons learned and never use them, this research has indicated how this may change in the immediate future. Establishing that mechanisms which relates to best practice within each emergency services or organisation may be adopted as mechanisms for identifying, remembering and utilising lessons learned is new to theory which can be further investigated by future researchers. This is because such mechanisms may vary from organisation to organisation and from country to country due to legislative policy and restrictions (Alexander, 2006). Although this research findings have shown that mechanisms may be best practices especially in the UAE context, it provides a contribution to theory that may be applicable in the global context and in the field of emergency and disaster management.

In addition to this, the guidelines for MEs and CP are also a contribution to theory since it was developed using this research findings and elements specifically investigated for the purpose of this study scope. The guidelines can enhance knowledge and understanding of minimum requirements for dealing with MEs and the essential components for effective CP. Other areas where this research contributed to theory include, the establishment of relationship between challenges and barriers for dealing with ME, which effective CP may help to address. Identifying the role of drivers such as existing best practice in enhancing the arrangements and building the necessary elements of effective CP is also another contribution to theory.

Contributions to practice is evident from the application assessment conducted in Chapter Five and the development of guidelines. Throughout this research and from the guidelines it has been established that CP is required for dealing effectively with ME, and that lessons learned from past events need to have mechanisms for remembering and utilising best practices. The guidelines provide steps, pathway and clarifies the process for improving current arrangements for dealing with MEs in the UAE as well as countries with similar EM system as the UAE. Beyond this, the elements within the guidelines informs emergency organisations in the UAE on how and with what they need to develop effective CP that may be sufficient enough to manage MEs with similar magnitudes as past ones, and future MEs with more magnitudes and consequences.

However, it is important to note, hence the assessment conducted in Chapter Five that elements of CP ought to be developed carefully and in consideration of legislative arrangements for each organisations and their roles and responsibilities in emergency/disaster response. In line with this understanding, the guidelines developed, explained and assessed in Chapter Five will be best positioned to contribute to practice of EM in UAE, especially in managing MEs through effective CP. Therefore, it is evident from the research contributions that, mechanisms ought to serve as reminders of challenges experienced when dealing with past ME so that capacity can be developed for preventing or coping with ME challenges. Both contributions made to knowledge and practice are important for advancing this aspect of emergency planning and response especially in the UAE where there is need to optimise response to frequent occurrence of ME. These contributions justify the rationale for carrying out this research, and serve as motivation for advancing this field of study.

## **6.5 Research Limitations**

Despite the completion of this research, there were limitations that the researcher had to manage. For instance, using mixed methods increased the amount of information that need to be classified, analysed and discussed. This posed a major challenging for the data collection and analysis phase which took longer than initially planned. The data analysis techniques also had to be changed from using only SPSS to factor analysis as a result of vast amount of information to process, analysed and discussed. Furthermore, the lack of empirical data specifically on ME and CP also prolonged the data collection phase and

the ability to establish strong UAE context for these two concepts. However, this was managed by evaluating case studies of past ME against concepts identified from existing literature in this field.

Although the area of ME is scarcely researched, being able to identify theories that align with characteristics of ME and CP were instrumental in restricting the impact of this limitation on the entire research. Being an officer in one of the organisations being examined in this research could have been resulted in bias and favouring one organisation against the other. However, the context established in the literature review served as solid epistemology for the research themes and stating the roles of each emergency organisation made it impossible to be bias, but also learn from the process. Ability to liaise with the supervisor and other experienced researchers and experts in this field have been crucial in managing these research limitations and retaining focus on how best to achieve the research aim and objectives.

## **6.6 Suggestions for Future Research**

The recommendations outlined in this chapter provides indications for areas of future research. First, the potential mechanisms for lessons learned beyond the ones identified in this research can be investigated in future research or by other researchers. It is important to explore other mechanisms for lessons learned especially for other phases of emergency management which are not included in this research scope. In addition to this, identifying mechanisms that may be used for other phases of emergency management i.e. recovery phase, mitigation phase, mitigation to preparedness phase are crucial for any country in order to build a comprehensive emergency management process. Comprehensive emergency management process is a necessity at the moment in the world and in future due to evolving risks and hazards that may occur in different unprecedented manner.

Other potential areas of future research coined from this research inquiry is that future researchers in emergency management, emergency planning and response is the importance of investigating the relationship between challenges and drivers in managing ME. While this research has briefly touched based on the existence of linkages between the two, it may be beneficial for theory and practice in emergency/disaster management to further investigate the nature of this relationship and how it influences the other phases

of emergency management. A further investigation in this area may help to resolve some of the problems in emergency management relating to building and enhancing resilience for all types of emergencies/disasters, building sufficient capabilities for response amidst limited resources and strict budget allocations. Furthermore, a research into this area may help to identify theories and models that enhance or limits the extent to which location, time, scope and nature of ME impact response capability of emergency organisations. While other researchable areas may be identified by other researchers, these few suggestions provide rationale for future researchers to advance inquiry into ME and CP. The next section summarises the research contributions and limitations.

## **6.7 Research Conclusions**

This chapter has summarised the research findings, explained the areas that may inform future research in this field, explained the contributions made to knowledge and practice as well as the research limitations. All these have all shown that undertaking a research in emergency management especially in an area where limited empirical data exists can be challenging, but feasible. It has been worthwhile critically reviewing the concepts of ME and CP as done in this research. A process which has increased understanding of these two concepts, but ultimately led to the discovery of gaps in the UAE emergency management arrangements. Examining the current practices and arrangements for managing ME as against other routine emergencies have shown that the UAE government authorities need to improve the level of knowledge, awareness and understanding of ME and CP if future ME are to be better managed.

Similarly, best practice in emergency planning and response need to include mechanisms for remembering and utilising lessons learned from past ME so that mistakes are not repeated and response to future ones are more effective. Such mechanisms are also important for ensuring that challenges are better managed and barriers to developing capacity for response to ME are managed. Such combined strategy has been identified in chapter two as drivers for improving arrangements for managing ME. Guidelines developed from all the research findings and epistemology of this study provides reassurance that improvement is possible in the UAE, but only if the guidelines and recommendations for practice are taken on board in the most practical collectively and in each organisation responsible for planning for and responding to ME.

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## APPENDIX 'A' – Research Ethics Approval

Academic Audit and Governance Committee

College of Science and Technology Research Ethics Panel  
(CST)



To: Hamdan Alshamsi (and Dr Chaminda Pathiranga)  
cc: Professor Hisham Elhadi, Head of School of SOBE  
From: Nathalie Audren Howerth, College Research Support Officer  
Date: 20/04/2015

MEMORANDUM

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**Subject:** Approval of your Project by CST  
**Project Title:** Managing Extreme Disasters: recommendations to develop effective contingency planning in UAE  
**REP Reference:** CST 15/08

Following your responses to the Panel's queries, based on the information you provided, I can confirm that they have no objections on ethical grounds to your project.

If there are any changes to the project and/or its methodology, please inform the Panel as soon as possible.

Regards,

A handwritten signature in black ink, appearing to read 'N. Audren Howerth', written over a horizontal line.

Nathalie Audren Howerth  
College Research Support Officer

For enquiries please contact:  
College of Science and Technology  
College Research Support Officer  
The University of Salford  
Maxwell building, (7th floor, room 721)  
Telephone: 0161 295 5276  
Email: [n.audren@salford.ac.uk](mailto:n.audren@salford.ac.uk)

## APPENDIX 'B' - Participants Consent Form

Appendix NO.C

### PARTICIPANT CONSENT FORM

**Title of Research Project:** Managing Extreme Disasters: recommendations to develop effective contingency planning in UAE.

**Name & address of researcher:** Hamdan AlShamsi, School of the Built Environment, University of Salford, United Kingdom.

Tel: 004478....., 00971.....

**Sponsored:** Ministry of Interior, United Arab Emirates

Please use the check box to the right corner after the statements.

1. I confirm that I have read and understand the Participant Information Sheet explaining the above research study and that I have had the opportunity to ask questions about the project. ☒
2. I understand that my participation is voluntary and that I am free to withdraw at anytime, without providing a reason. ☒
3. I agree to take part in the above research study. ☒
4. I understand that if I decide to participate in this study, then the results obtained from this study may be kept for possible use in future studies. ☒
5. I understand that my anonymity is assured and that only the researcher involved in this study at the University of Salford, UK, will use the data. I thus give permission for this individual to use this information as they wish within academia. ☒

**For researcher's use only:**

I agree to the interview being audio recorded.

Y/N

☒

I agree to the use of anonymous quotes in publications.

☒

Ali Aljabri  
Participant's Name

4<sup>th</sup> 106/15  
Date

[Signature]  
Signature

Hamdan AlShamsi  
Researcher's Name

4<sup>th</sup> 106/15  
Date

[Signature]  
Signature

**Copies:**

Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent. A copy of the signed and dated consent form should be placed in the project's main record (e.g. a site file) which must be kept in a secure location



Date: 15<sup>th</sup> Jul/2015

Hamdan AlShamsi  
School of the Built Environment  
University of Salford  
United Kingdom.

Re: Department Authorization

Dear Mr. Alshamsi:

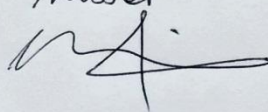
I have reviewed your request regarding your study and am pleased to support your research entitled "Managing Extreme Disasters: recommendations to develop effective contingency planning in UAE".

Your request to interview and administer questionnaires to staffs in our department for your research is granted. The research may include discussion with staffs including myself, giving out questionnaires to fill, as well as conducting semi-structured interviews, and the audio taping the semi-structured interviews with staff members of the department is permitted.

This authorization covers the time period of May 1, 2015 to September 30, 2015. We look forward to working with you.

Sincerely,

Head of Department

Nasser  


## APPENDIX “C” - Research Questionnaire and Interview Questions

### Sample Questions for Research Questionnaire

#### QUESTIONNAIRE

This research survey is made by Hamdan AlShamsi in view of completing PhD in Managing Major Emergencies; recommendations to develop effective contingency planning in the UAE. I am therefore requesting for your voluntary participation in filling this questionnaire. All information provided by you will be held in confidence and will be used for the sole purpose of this research without reference to your name or person.

<b>ORGANISATION:</b>	ADP
<b>DEPARTMENT</b>	Crisis and disaster department
<b>POSITION</b>	Business continuity section

1. How long (Years) have you worked in your organisation? *[please tick the applicable one]*

<b>0 – 5 years</b>		<b>16 – 20 years</b>	
<b>6 – 10 years</b>		<b>20 – 25 years</b>	
<b>11 – 15 years</b>		<b>Over 25 years</b>	

2. Is there any contingency plan or planning used to plan and respond to extreme disasters?  
*[please tick the applicable one]*

Major Emergency is any event with initial physical phenomena which is escalated through stages or has overwhelming onset that result in consequential physical impacts with severe outcomes on human, society and ecosystems (Mitroff, 2004; Turner and Pidgeon, 1997; Perrow 2011)

Contingency planning is considered as measures developed to prepare for and to react to possible event change which exceeds normal response efforts but whose impact can severally affect security, resources, assets, human and the society (Schneider 2004).

<b>YES</b>	<b>NO</b>	<b>Not Sure</b>

3. If your answer is No, please go to question number (5) If your answer is Yes, can you please list the crisis or/and disaster which contingency planning has been used to manage?

**Answer: Training and exercises for extreme disaster**

4. Please tick on a scale of 0 to 5, with 5 being the highest indicate how effective the contingency plan was for managing the extreme disaster.

<b>0 (None)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5 (Highest)</b>

5. Have you heard about contingency planning before? *[please tick the applicable one]*

<b>YES</b>	<b>NO</b>



6. Please identify and rank by ticking which is the most prominent challenges in **responding** to extreme disasters in the UAE?

	0 (None)	1	2	3	4	5 (Highest)
Too difficult to manage during response						
Unforeseen or unpredictable						
Lack of resources						
Lack of experts who can lead response						
Lack of contingency planning						
Don't know						
Others: <b>People gathered on the incident. (3)</b>						

7. Please identify and rank by ticking the most common barriers for **planning** for extreme disasters in the UAE?

	0 (None)	1	2	3	4	5 (Highest)
No documents or lessons to learn from						
Lack of experience managing extreme disasters						
Frequent change of personnel						
Lack of training and exercise to prepare for extreme disasters						
Lack of contingency plan as guidelines for preparing for extreme disasters						
Don't know						
Others:						

8. Please identify and rank by ticking the main driver(s) for ensuring that extreme disasters are effectively managed in the UAE?

	0 (None)	1	2	3	4	5 (Highest)
Good information and communication about extreme disaster during response						
Learning lessons from past extreme disasters in the UAE						
Having many emergency organisations manage extreme disasters						
Routine preparedness training and exercise						
New technology and resources for early warning system and response						

### **Research Interview Questions**

For the purpose of this research, major emergency and contingency planning have the following meanings; Major Emergency is any event with initial physical phenomena which is escalated through stages or has overwhelming onset that result in consequential physical impacts with severe outcomes on human, society and ecosystems (Mitroff, 2004; Turner and Pidgeon, 1997; Perrow 2011).

Contingency planning is considered as measures taken to prepare for and respond to extreme event whose impact can severally affect security, resources, assets, human and the society (Schneider 2004).

**Q1** Can you describe the **current practices** and **arrangements** used by the UAE government in managing major emergencies when they occur?

**Q2** Do you think that the **level of preparedness is sufficient** enough in managing major emergencies?  
Please specify

**Q3** What are the **challenges** that your organisation have faced when planning for major emergencies?

**Q4** What are the **barriers** to effective planning for major emergencies?

**Q5** From your experience, what are the **factors/drivers** that contribute to effective management of major emergencies?

**Q6** What areas do you think need to be **improved** in the core emergencies response agencies? and why?

**Q7** Do you think **lessons have been learned** from the last ME will be used in managing any future major emergency?

**Q8** Do you have contingency plan for major emergencies, or it is just sets of actions every responder must know?

## **APPENDIX “D” – Researcher’s publications from this Research and others**

AlShamsi, H. and Pathirage, C. (2015). “The role of effective contingency planning in managing extreme disasters in UAE”, Conference Paper No ID 006; 12<sup>th</sup> International Post-Graduate Research Conference (IPGRC), School of the Built Environment (SOBE) at the University of Salford, June 2015 [Online] [http://www.salford-ipgrc.com/downloads/IPGRC\\_2015\\_Proceedings\\_FINAL\\_ed.pdf](http://www.salford-ipgrc.com/downloads/IPGRC_2015_Proceedings_FINAL_ed.pdf) .

AlShamsi, H. (2015). Expanding the spectrum of Emergency Management: Balancing theory and practice. In International Association of Emergency Managers (IAEM) journal (December 2015) “Expanding the Spectrum of Emergency Management”. USA, Vol. 32, No. 12: pp 33-35; 2015